OCTOBER 1940

FOOD INDUSTRIES

HOMES OF FAMOUS FOODS . . . GENERAL FOODS CORP., BATTLE CREEK, MICH.

IN THIS ISSUE:

How X-Rays Aid in Controlling Quality

British Methods for Getting Rid of Rats

Gas Storage of Fruits and Vegetables

When is "Clean" Equipment Really Clean?

Flue Gas Used To Avoid Dust Explosions

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★HOME OF FAMOUS FOODS

Breakfast food for the nation is made in the plant shown on the cover this month. It is the large cereal plant of General Foods Corp. at Battle Creek, Mich., the home of "Post Toasties," "Grape-Nuts," "Grape-Nuts Flakes," "Post's 40% Bran Flakes," "Bran Shreds" and "Postum."

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In THIS *Issue*

• SPOTLIGHTING SABOTAGE

If you operate an important plant you ought to be on the watch against sabotage—particularly if you have Army or Navy contracts. World War experience showed that a great proportion of the destructive acts of foreign agents were committed before we were at war. Flood-lighting your factory grounds at night is the first line of defense against malicious intruders. Page 49.

• SEEING THE INVISIBLE

Be as careful as you may and still some bit of metal, a shell, a stone, a wood splinter or a piece of glass will get into one of your finished products. Then you lose a customer if you're lucky and have a damage suit if you're not. But x-rays overlook nothing when they "see" through a package or product. And several food manufacturers are using x-ray inspection, at little expense, to put the clincher on quality control. Turn to page 43.

• GIFT A LIFT TO SALES

Have you ever tried packaging your products so that they will be bought as gifts? Purchase-for-gifting is plus business that gets you two customers on every sale—the gifter and the giftee. Look at pages 64 and 65 to see how various food items are being gift-packaged to boost sales.

• CHASING MILK CAN SMELL

That a clean milk can could be a source of contamination would seem to be a paradox, but Beatrice Creamery Co. finds that it isn't. Thorough investigation has proved that certain microorganisms survive the customary alkaline washing and that an imperceptible film remains on the cans to nourish them. So Beatrice developed a method to eliminate this trouble. How it's done is told on page 39 by M. E. Parker, manager of production.

• FLUE GAS STOPS EXPLOSIONS

Explosions are an ever-present danger in any food plant handling finely divided, combustible material. Whenever one of these hazardous dusts mixes with air in the right proportions, it needs only a spark and—blooie! Quaker Oats Co. found out that all this grief could be avoided by modifying the atmosphere in the dangerous locality by adding carbon dioxide in sufficient quantity. And flue gas proved to be a ready source of carbon dioxide. R. O. Kirn, formerly chief engineer of Quaker Oats, describes the method on page 52.

In FORTHCOMING *Issues*

• LET THERE BE LIGHT

No light, no production—that's obvious. "Yes," you say, "but our plant has a 'lighting system.'" So what? Too many plants have a "lighting system" and let it go at that. Plant lighting should be a subject of frequent and regular checking. Upon its maintenance at the most suitable level depends the quality control, output and employee morale of the plant. How to check a plant lighting system, what to look for, and what to do about the findings will be told in the near future in Food Industries by an expert.

• SPARE THAT MAN!

That there are too many accidents in food plants is borne out by National Safety Council statistics (Food Industries, September, 1940, page 52). So greater safety is one of the goals intelligent managers will strive to attain, for selfish as well as humanitarian reasons. Effective safety posters effectively used do much to prevent accidents. Several such posters used by food companies will be illustrated in an early issue, with information on how they are employed.

• THE FROZEN FOOD PICTURE

Food Industries' Frozen Foods Directory will be brought up to date in the December issue. There will be 15 to 20 pages of statistics on the growing freezing industry. Companies freezing foods will be listed, together with plant locations, brand names, products frozen, containers used, freezing system employed, output for 1939 and 1940 and intended production for 1941.

• WHY SPECIAL PACKAGES?

Many food companies make a practice of packaging certain items of their line or even assortments of their whole line, in special packages. Often these packages are elaborate, truly "gift" packages in material and design. Some of these special packages are distributed through retail outlets to the general public, some are sold only by mail, while others are reserved for sale to stockholders and employees. Food Industries has made a study of the results attained with these special packages. A summary of the findings of this study will appear soon.

FOOD INDUSTRIES
DISTRIBUTION • PROCESSING
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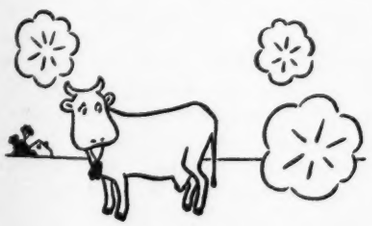
LAURENCE V. BURTON, Editor
Volume 12, Number 10 October 1940

The Talk of the Industry

» LIFE SAVERS, INC., believes in being prepared for any eventuality. It has more than 10,000,000 lb. of sugar in storage, representing about one year's requirements.

» TRANSFERRING those 50 destroyers to Great Britain may be helpful even to the food industry provided that it permits more food to be exported to the U.K. At any rate it is expected that more convoys will now be possible, and some of them should carry substantial quantities of foodstuffs.

» Among the lesser horrors of war is a tale from England about a Welsh farmer who was prosecuted for selling milk that was deficient in butterfat content. He successfully pleaded that bombing was responsible and was supported by a dairy scientist who testified that within 24 hours after the raid only four out of 21 cows gave normal milk.



From Italy comes another tale. The Ministry of Corporations has ruled that henceforth there shall be but one type of spaghetti instead of the multitude of shapes that have identical composition but many fanciful names. It begins to look as if the Italian food supply were growing short.

» AMERICAN firms are receiving occasional inquiries for names of possible sellers of exportable foods for shipment to conquered European countries. One of these inquiries has been referred to us. It required two months to arrive via Siberia and Japan. If it should have resulted in business, presumably the shipment to Europe would have been via Japan, Siberia, Russia, Germany. It is very doubtful if such a shipment would ever get beyond Germany, if, indeed, it were ever intended to go anywhere else.

Don't be optimistic about such inquiries.

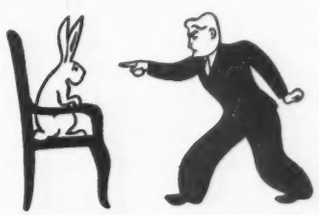
» In the confusing trends of these wild days it would be helpful if the Department of Commerce and the Department of Agriculture would get together in their views about the economic status of the export-import business of the United States, particularly as it pertains to foods. Commerce seems to feel a bit of satisfaction about the ascendency of exports over imports, but agriculture is very lugubrious about everything.

» DR. WALTER J. PETERSON of Kansas State College recently quoted the following from the Bible to the American Chemical Society to show that vitamin A deficiencies were manifest as far back as the time of Jeremiah.

> "Yea, the hind also calved in the field, and forsook it, because there was no grass.
>
> "And the wild asses did stand in the high places, they snuffed up the wind like dragons; their eyes did fail, because there was no grass."
>
> Jeremiah 14: 5 and 6.

Evidently there were shrewd observers in those long past days if they were able to identify what we now know as xerophthalmia.

» "U.S. vs. 7 Barrels of Rabbits," "U.S. vs. 3,000 Rabbits," "U.S. vs. 2,000 Rabbits," "U.S. vs. 90 Baskets of Rabbits"—all these cases, recently



reported in Notice of Judgment under Food, Drug and Cosmetic Act, were seizures because the product was "in whole or in part from diseased animals." Evidently the rabbit business is not doing so well—nor are the rabbits either.

» NOTICE of Judgment under the Food, Drug and Cosmetic Act never ceases to be an entertaining bit of occasional reading. At times the judgments are nothing short of amazing. Take case No. 370, "Misbranding of Cookies," for instance. The document says in part:

"This product was deceptively packaged, since its container was filled only to approximately 52 percent of its capacity; and the statement of the quantity of contents was printed on the bottom of the package."

Can it be possible that any food manufacturer or distributor would be

so simple minded as to ship goods in interstate commerce without reading the much publicized new food law? Apparently it is. The price of learning what the law means in the foregoing incident was the value of 326 packages of cookies plus freight from Los Angeles, Calif., to Globe Ariz., plus costs of excited correspondence, plus lost good will, plus vexation and annoyance.

A number of other reported seizures, allowed to go by default, because of presence of rodent hairs, insects and other foreign substances shows the need of good housekeeping in food plants and knowledge of fumigation and proper packaging procedure.

Live and learn.

Anti-sabotage Precautions

FEDERAL Bureau of Investigation's advice on how to guard defense plants against sabotage is now available to business and industry for the asking.

The new policy will not be formally announced because the amount of service which can be given is limited. But responsible officials of any plant vital to national defense may request FBI to make a survey—to include expert analysis of "weak spots" in factory set-up and existing protective measures, and recommendations of what should be done.

Specially trained "sabotage agents" are available for these studies. Their recommendations are not binding upon the company requesting them, and will be kept strictly confidential.

Why Silence May Be Dangerous

WHILE the food industry has no occasion for smugness in the current Washington situation, the occasion presents a splendid opportunity to call attention to the economic value of good public relations technic and long experience in its application. Manufacturers who operate the heavy industries so much needed in the national defense program have the misfortune to lack the beneficial experience of daily contact with the general public which characterizes the business of production and distribution of foods. And hence the durable goods manufacturer has had less incentive to learn how to cultivate public good will or to develop that far-seeing attitude that instinctively tells him what is likely to be the public reaction to a given course of action or to a contemplated public statement (or studied silence on some subject of great public interest).

In the field of good public relations technic, where there is a great public interest in the decisions of a corporation and especially in the reasons underlying those decisions, silence is not golden—it is dynamite that may blow up with unfortunate, if not disastrous, results. For, if the public, and its representative—the daily press—wants to know the real reason why the armament orders are not being placed with great speed, somebody—usually a self-seeking politician—will supply a glib phrase that purports to be the correct answer. And usually it will be as wrong as it can be, though it will suit the politician's purpose very nicely. If industry does not state its own case clearly, rationally and emphatically *at the right time* and in the right place, then there is nobody to blame but industry.

To heavy-industry manufacturers, whose prior interest in cultivating public esteem has stemmed from strikes and hostile New Deal legislation, the idea seems never to have occurred that their own problems of financing their plant expansions to take on armament orders, or their possible tax obligations accruing from acceptance of a government order, were of genuine interest to the public. Lacking this awareness of the sequence of thoughts and public utterances that would inevitably follow any protracted negotiations, they have frequently failed to tell the public the reasons why. This has presented a welcome opportunity to the politician to rationalize the situation at the expense of industry by "surmising" that industry is more interested in profits than in national defense, that industry must be conscripted and forced to do its part.

Silence at the wrong time is bad public relations and is a real peril that may culminate in the form of very unwise legislation. More practice and experience is required in the technic of good public relations than to develop great skill in public debate. Heavy industry has muffed the ball rather badly in recent months by per-

Hors d'Oeuvres

• Bombs bursting in Britain have spoiled much packaged food by driving splinters of glass from store windows through the containers. Armored tin plate and bullet proof glass seem to be needed to protect the beans in this modern world.

• *People ate coffee instead of drinking it one thousand years ago. The berries were crushed and mixed with fat to form food balls. Later it was a wine, then a medicine and finally a beverage. Now the tempo of modern civilization can in a measure be credited to the quick coffee pick-up, if "credited" is the word.*

• A newspaperman who recently left Russia predicts that the Reds will not entangle themselves in a major conflict because the people's interest and energy are completely taken up with acquiring the necessities of life. Food is the tail that wags the Bear.

• *For every pound of free fish the sportsman puts into the skillet he spends $3 to $5 for tackle, licenses, gasoline and what not. But you should have seen the 50-dollar one that got away!*

• Kellogg Co. says that eight million Americans eat its cereals every morning and consume more than a million quarts of milk and 83,000 lb. of sugar with the breakfast food. Don't tell Attorney General Arnold. He'll say it's a conspiracy in restraint of toast.

• *Wine made from milk—from the whey left after cheese or casein is made from milk—is a recent chance discovery at National Dairy's Sealtest Laboratories in Baltimore. Elsie, you've been holding out on us!*

• That you can see flavor and taste color has been demonstrated by an illumination engineer. A special dinner was served under lights that made the steak look ashen gray, peas black, coffee sickly yellow and milk blood red. Few were able to eat, and some of those who did suffered indigestion. It seems things are what they seem.

• *Northwestern Yeast Co. is conducting a campaign to restore breadmaking as an American home art. And after the bakers have done so much to emancipate kitchen drudges so they could be slaves to Culbertson.*

• It takes 13.63 hours for a workman in America to earn a week's food for a family of four, 35.97 hours in Great Britain, 35.81 in France, 37.98 in Belgium, 44.88 in Germany and 76.73 in Italy. Hitler says America is a plutocracy. He's right. Every man is a plutocrat.

• *Aristotle described honey as "dew distilled from the stars and the rainbow." What a hell of a food technologist he must have been.*

• So you never heard of air conditioning until recent years? My, my. Air conditioning was employed in the food industry more than 60 years ago. In 1880 Robert Portner, a brewer in Alexandria, Va., patented a mechanical air conditioning apparatus. He kept the air in his fermenting room cold and free of dust by liquefying anhydrous ammonia.

• *As to the propriety of dunking we quote Arthur "Bugs" Baer: "It's bad manners but good taste."* F.K.L.

mitting adverse public opinion to develop because of insufficient publicity and then trying to explain it away by belatedly telling the facts that should have been made public at the outset. Belated statements are no longer spot news and have a way of getting buried deep inside the newspapers.

This problem of industry is particularly acute because this is an election year, and unstatesmanlike politicians whose sole source of livelihood comes from salaries derived from public office will grab every opportunity to perpetuate themselves in office regardless of the truth or consequences to any one else. Hence silence at the wrong time may be very dangerous.

FSA Is Proceeding Logically

FSA executives have shown two clear evidences of their desire actively to cooperate with food manufacturers in applying standards of identity, and deserve the appreciation and compliment of the food industry for this.

In one case by official notice they draw attention to the fact that the proposed regulations for dietary foods permit manufacturers in many cases to decide for themselves whether they wish to put their products into the dietary food class or not. Manufacturers of milk products will not be in this special dietary class unless they make claims for their foods which indicate a special dietary significance. The producers "can therefore exercise their own choice as to whether or not they subject their products to the special labeling requirements."

In the preserve standards, which temporarily rule on the bitter sweetener controversy, FSA also indicates a cooperative spirit. It points out that this preliminary finding is not to be construed as policy making. And it tells preservers that they may go ahead and prepare labels for use under these promulgated standards with the assurance that changes later will be made without compelling the destruction of many labels, if these are "labels purchased now in reasonable quantities."

Incidentally, this preserve standard promulgation of early September largely continues in effect the policy under the Hyde ruling which the Department of Agriculture had been applying with respect to the sweetener controversy. It represents, therefore, a minimum of shock to the sweetener user.

All the food industries will welcome these evidences of the constructive cooperative spirit in high official places. In return, they will owe a similar cooperation as an industry as the work of food and drug law administration continues.

To Men of Draft Age

With the calling up of the National Guard, and the imminent drafting into service of our greatly enlarged army, it is likely that many a young man from the food business will be soon learning what used to be called Squads East, and Butts Manual and Bayonet Practice. This will be liberally interspersed with fatigue duty (hard manual labor to you), such as ditch digging, hauling of supplies and garbage, unloading freight cars, care and handling of motorized equipment, and all the multitude of jobs that have to do with a modern army and the art of warfare, not to mention K.P.

If you are one of them or have a son or friend who is soon to be called to service, these remarks from one who has been in the ranks may be very pertinent. Though military life calls for practically every one of the skills that find employment in civil life, it is ever imperative that a soldier have well-developed muscles. The army will see to that, and it is not uncommon that a man's collar size will increase by two full sizes after one year of the intense physical development that he will undergo.

For a man whose muscles are soft and flabby the first few weeks of the hardening up process will be a period of intense anguish unless he starts right now to develop himself. Let him start with the "daily dozen" or any other system of moderate exercise and build it up gradually until it is a "daily fifty" of every stunt. Keep it up religiously. Long walks at a brisk pace should be included. And when he finally gets into the hands of a drill sergeant he will be able to carry on with relative ease and freedom from muscular aches.

For a man who is physically developed and can adapt himself to the requirements of military discipline, a year or two in uniform can be made a very important and worth-while experience. The benefits to the individual depend largely on himself and his attitude toward his new life.

The Coming Winter

Another significant test of the 23-year weather cycle theory will occur this winter. If the theory is a sound one this winter will be a repetition of the winter of 1917–1918, which was about as severe a winter as any living person can recall.

Though the U.S. Weather Bureau is inclined to scout the theory, we are of the opinion that, as yet, it has been neither proved nor disproved. Should the coming winter turn out to be a very severe one, and if you are in a position to prepare more effectively to cope with much snow and intense prolonged cold spells, then do not say you have not been tipped off to such a possibility.

To Men Seeking Jobs

So many job seekers exhibit the same traits that it is necessary to talk very plainly. By these traits you hinder your own chances of connecting with a prospective employer or else cut yourself off from all chance of future help from this publication.

These two traits are: (1) Failure to notify us when you get a job, thereby placing us in a position of recommending candidates who will not consider an offer; (2) failure to notify us of a change of address or leaving former addresses without any forwarding address.

In the latter category a job was recently open that was fairly crying for the specialized training and experience of one of you who had requested our aid. But when we tried to bring you and the employer together it was found that you were unknown at the address you had given us.

Frankly, some of you need to have your heads examined.

Alcoholic Motor Fuel Again

Alcohol as a motor fuel is to be studied at the Peoria laboratory of Regional Laboratories of the U.S. Department of Agriculture. It is to be hoped that this time the study will be so complete that it will put a stop to uninformed politicians who continually resurrect this grain alcohol theory. There is nothing new to the idea of mixing alcohol and gasoline. It has been and is being done in many places. All that is needed is a fermentable carbohydrate, e.g. corn, at almost nothing per bushel or gasoline at very high prices to make it feasible today in the United States.

But as long as governments find taxing of alcohol to be a favorite form of taxation, the industrial uses of ethyl alcohol will always be very limited.

Watch Your Step When Selling to Uncle Sam

Congress is still struggling with the plan for levying special taxes on "excess" profits. Sooner or later, perhaps even by the time this editorial is printed, we shall know how a distinction is to be made between profits

made in ordinary business and profits made on dealings with the government itself. Those who sell foods to the government will need most carefully to consider that aspect in their price making.

If the government intends to differentiate, as many members of Congress desire, between profits on ordinary business and profits on government business, then those of us who have to furnish food for great Army and Navy units will have a little special calculation to do on this one point alone. No matter how this detail works out, we will all pay bigger taxes next year on this year's income and business.

Valuable Sources Of Information

WHERE can we buy them? That is a question which has arisen several times as a result of our publishing a formula calling for tamarinds.

Well, to tell the truth, we ourselves didn't know, but here is the way by which we proceeded to learn the answer. So simple is it that we relate it in full, lest so obvious a procedure escape notice.

First: "Webster's Unabridged Dictionary" was consulted, from which it was learned that the tamarind is a native of India.

Second: A telephone call to the nearest Indian consular office procured a list of New York importers of tamarinds.

We digress momentarily to comment that one who is trying to look up a strange subject should always consult the unabridged dictionary first. Many years ago this department wasted four futile days in a library trying to find out the identity of a substance called "azotate of uranyl." In despair we asked the old lady librarian if she could suggest the next move. She told us to consult the dictionary. We did. And there it was: an obsolete name for uranium nitrate.

Consular offices are valuable sources of information about the products of the country they represent.

It's easy when you know how.

What the Patents Digest Means to You

WHY does FOOD INDUSTRIES publish a monthly list of the more important patents affecting the food processing industry?

A chance remark from a manufacturer who could not, by any stretch of the imagination, be called a research-minded person, prompts us to pose the question and then answer it. This particular manufacturer is a man who is generally regarded as a smart, practical business man. Yet there are times when he is too practical for his own good. Up to now he has been making only fair profits and he is complaining of increasingly intense competition.

Even a superficial observation of his organization quickly reveals that, if any new ideas come into the place, these ideas are brought in by salesmen from concerns who would sell him equipment, supplies or services. In a very handsome office he sits and waits for someone to come in and "sell" him whatever progress may be had by outright purchase. And, if anything ever goes haywire in his plant, he has always been able to hang it onto somebody else. The fellow who sold him the new idea, process, gadget or equipment is always maneuvered into a false position and is forced to extricate the smart business man from his difficulty or else be forever in the doghouse. And, many a time, the problem is entirely the food manufacturer's—not the unfortunate salesman's. But to retain the buyer's good will, the salesman's principals must come to the rescue.

Such a food manufacturer never reads the patents page. It would never occur to him that he, too, might be developing new and patentable methods, processes or foods; and that he might also be making improvements which, though non-patentable, might save him much money or open new sales possibilities.

If you are a manufacturer who has no research department or no quality control chemist, or no food technologist in your employ, you should anxiously watch these new patents as they are issued, for you may suddenly realize that some competitor is getting the jump on you.

Companies that have well-organized research department do not need the FOOD INDUSTRIES patents digest, for they subscribe to the *Patent Office Gazette,* even as we do. Nevertheless many such concerns find our digest complete and thus save themselves a duplication of effort.

Our patent digest is for the benefit of those who do not understand research (which is merely a name for invention done to order), or who do not employ a research department. Take page 97 of the August, 1940, issue, for instance. You need a wide knowledge of the food industry to get the full implications of the brief announcements. Sidney Musher, who had 24 patents listed in our July issue, gets a few more here. You may discover that he has received a patent No. 2,199,364 on a new type of olive-flavored oil on which we commented editorially in June, on page 35.

B. H. Thurman, Bronxville, N. Y., gets three patents of decided interest to bakers. Maybe these will mean more to you when you know that Mr. Thurman is in charge of the Long Island plant of Durkee-Famous Foods, Inc.

Standard Brands gets a couple of patents, Land O' Lakes Creameries gets one. So does Crosse & Blackwell. Kenneth Hickman gets one on vitamin A concentration. It may surprise you to know that he is with Eastman Kodak Co. And there are two more to Industrial Patents Corp., which is the patent-holding subsidiary of Swift & Co. There are many others, too, some of which may be important to you—some not.

The big point to all this is that there is no defense against research-minded competitors except by research. We published the patents digest so that you can easily see where your competitors are going. They don't need our patents digest, but if you don't believe in research, you need the digest very much.

Sometimes it will be very alarming reading.

Insufficient Insurance

THE MYSTERY of the sale of a once fairly profitable food business to strangers at a bargain price has at last been cleared up. For diplomatic reasons all names are omitted. Insufficient liability insurance was the basic cause for the unexplained retirement of the original owners.

A bus had developed a flat tire on a through highway late at night. Passengers crowded round the driver as he struggled to change a huge left-hand tire, thereby obscuring the bus tail-lights from an oncoming truck owned by the food company. The night was dark, the road was fairly clear, the truck driver knew the road and was hitting it up, when he plowed into this mass of bus passengers. The slaughter was awful.

Ultimately judgments against the food company were so far beyond the amount of liability insurance carried on its truck fleet that the company's working capital was gone, its credit ruined, and it was a case of sell out for a song. The company could not continue in business.

Such a terrible accident could happen anywhere, even to the trucks of the kindliest company in the land. While in cold-blooded justice the fault was not that of the food company, it is well known to all litigants that a jury's sympathy is always with the injured. There is no substitute for eternal vigilance and adequate insurance coverage.

When Is "CLEANED" Equipment Really CLEAN?

Studies on milk-can washing show need for acid rinse to remove invisible, bacteria-containing films remaining after thorough "cleaning" with alkaline detergent solutions, hot water rinses, and steaming

By M. E. PARKER

Manager of Production, Beatrice Creamery Co., Chicago, Ill.

EXPERIENCE encourages us to suspect that slip-ups in food quality control are often closely allied to shortcomings of the sanitary or cleaning practices followed in the processing plants.

Such a suspicion can only be confirmed or dispelled by exhaustive investigations comparable to those carried on by the quality control laboratory of Beatrice Creamery Co. in connection with the washing of metal milk and cream cans.

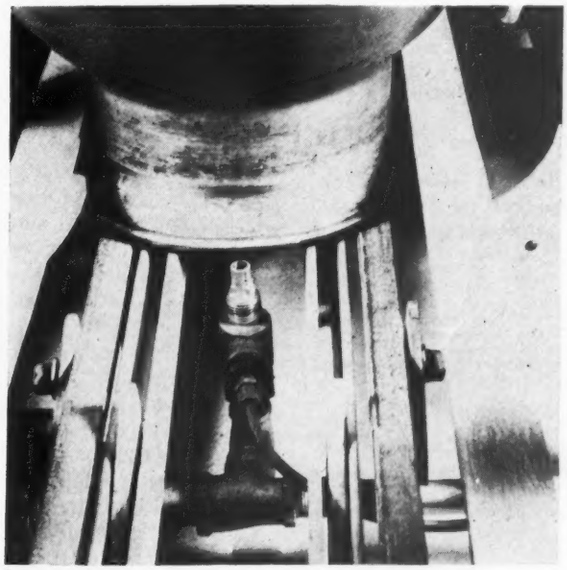
We realize that these breakdowns in quality control effectiveness are paradoxical to the efforts being quite generally expended for cleanliness as a prerequisite to marked quality improvement in food manufacture. Yet, the familiar 5-, 8-, and 10-gallon milk or cream can with its metal top or pulp cap closure is a case in point.

In keeping with the axiom of sanitarians that "whatever is easily cleaned is invariably found clean" these cans are constructed to that end. Elimination of seams, formation of well rounded, easily cleaned curves in place of the bacteria and dirt harboring sharp creviced inner corners, replacement of the water and mud collecting dished cover by the umbrella top, and use of non-corrosive, even non-ferrous, metals have all contributed to make these cans suitable receptacles for milk and cream.

Also, during recent years there have been many technological advances in respect to the engineering features of can washing equipment. In the design and operation of automatic washers, emphasis has been placed upon the delivery of a physically clean, dry, and hot can. We use the words "physically clean, dry, and hot" advisedly. "Physically clean" refers to the absence of *visible* dirt, milk solids, or other extraneous matter rather than to positive evidence of a metal surface free from contaminating materials. A further step might be taken to make clear that "visible" means *macroscopic* evidence rather than the *microbiological* and *biochemical* factors that apparently have been ignored. "Dry" implies the absence of moisture on the inner surface of the can and its cover. "Hot" means that the can and its lid are at a sufficiently high temperature to make their handling with bare hands a painfully unpleasant job and incidentally to discourage bacterial growth and decomposition.

Reason for emphasis upon a "physically clean, dry, and hot" condition of the cans when discharged from the washing machine is that otherwise the cans invariably develop offensive odors. These odors suggest some form of protein splitting or cleavage. Most sanitarians seem to be satisfied as long as the machines do not deliver the cans in a moist, tepid condition even though when wet they might be clean by all visible evidences. Then too, most milk sanitarians are so willing to accept the standard plate count as the proper yardstick of the sanitary quality of milk and the sanitary condition of its containers that apparently no one has been much

a



b

Fig. 1—(a) and (b) For the acid rinse treatment of cleaned cans, the solution is drawn from the glass container in (a) into the steam driven through ejector nozzle in (b) positioned directly under the inverted can at the acid rinse position in the can washer.

interested in the microbiology and biochemistry of can washing.

In the face of this status of can washing practice, the Beatrice Creamery Co. became aware that expenditures made for improved plant and equipment sanitation were not paying the expected dividends. Quality improvement in the company's products was not noticeable even though: (1) an independent and private study was underwritten for the development of special dairy detergents best suited to its needs, (2) specifications and formulas were established for detergents used almost uniformly throughout its dairy plants, and (3) improved sanitary practices were followed.

Then it was that the quality control laboratory was instructed to find out why satisfactory returns were not being realized from these investments. The laboratory approached the problem from the basis of cleaning fundamentals; that to clean a surface one must first be able to wet it with a film of the cleaning solution itself.

That approach called for accurate knowledge of the alkalinity of the washing solution as well as of how the solution might be kept to its proper strength. With the aid of an instrument (Fig. 2) designed to measure the alkalinity of solutions in terms of their electrical resistance, automatic control of the cleaning solution in the can washer was obtained.

Yet, when apparently clean cans were moistened, either by rinse water or by the condensation of steam, a definitely offensive odor developed in them.

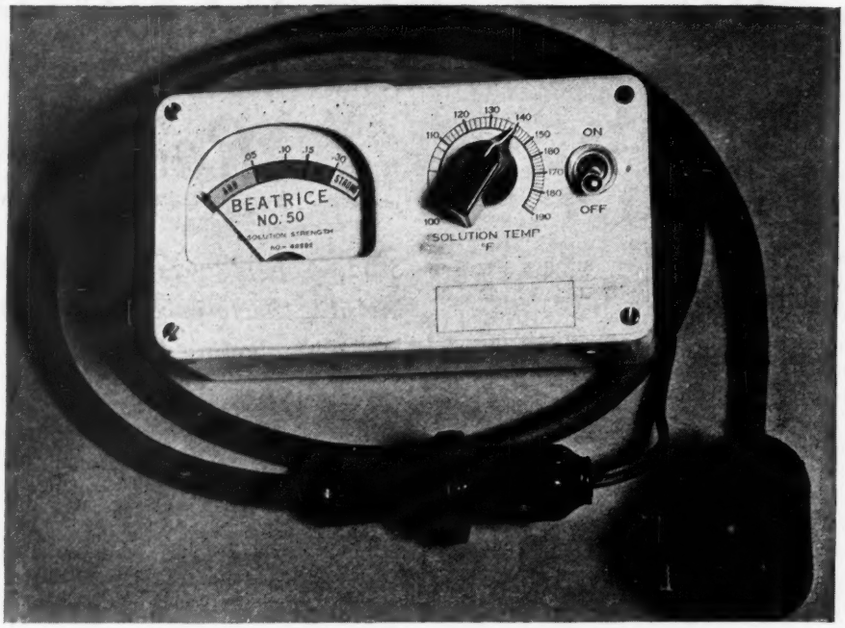


Fig. 2—Strength of alkali solutions used in automatic can washing is determined by an indicator registering the flow of an electric current through the solution; electrodes in lower right are immersed in the solution.

Table I—Rate of Corrosion on Iron Surfaces[1] by Some Organic Acids

Acids Used	Weight loss in mg.
Phosphoric	281.7
Tartaric	117.6
Citric	89.0
Aconitic	75.0
Tricarballylic	52.6
Fumaric	24.6
Gluconic	13.8

[1] 24.19 sq. cm. exposure in 0.5 per cent solution at 212 deg. F. for 1 hour.

Table II—Rate of Corrosion on Tin-plate Surface[1] by Some Organic Acids

Acids used	Weight loss in mg.
Phosphoric	1.00
Tartaric	0.79
Citric	0.74
Gluconic	0.47

[1] 24.19 sq. cm. exposure in 0.5 per cent solution at 212 deg. F. for 1 hr.

Table II (a)—Rate of Corrosion on Tin-plate With Exposed Iron Surfaces[1] by Some Organic Acids

Acids used	Weight loss in mg.
Phosphoric	10.6
Tartaric	2.4
Citric	1 6
Gluconic	0.6

[1] 24.19 sq. cm. total exposure in 0.5 per cent solution at 212 deg. F. for 1 hr.

The development of that odor, after all the care which had been taken in the washing of those cans, really lifted the veil of mystery as to why previous sanitary practices had failed to give the desired results.

Investigation revealed that most mechanically cleaned cans had an unmistakable inoculation of proteolytic types of bacteria; that such microorganisms were found most abundantly in the cans cleaned last in a day's run. Further studies indicated that these bacteria were being developed in the cleaning solution in spite of temperatures as high as 170 deg. F. and alkalinity as strong as pH 10.

As the day's operation continued, sufficient protein accumulated in the can washer to increase the film-forming properties of the cleaning solution. The film thus formed appeared to cling to the metal surface in spite of the subsequent hot water and steam rinses and hot air blasts. It also retained the undesirable proteolytic bacteria and protein food material for the bacteria in sufficient concentration to make trouble if the can became moistened before again being filled with milk or cream. In fact, sometimes even dry cans inoculated the milk with bacteria which imparted bitter and often stale flavors to the fresh cream or milk contained in them.

Test runs showed that sterilizing steam having an acid reaction would correct this condition by: (1) releasing the colloidal film of cleaning solution with its bacterial contamination and nutrients generally adhering to the metal surface of the can, (2) greatly increasing the sterilizing action of the steam itself, and (3) leaving the inner surface of the can in an acid condition. The apparent effect of the treatment is that no appreciable concentration of protein material or proteolytic bacteria remains, as has been repeatedly demonstrated by: (a) no development of offensive odors in a moistened can, (b) a preponderance of acid types of bacteria in exhaustive microbial examinations of washed cans given this final acid rinse, and (c) the incidental reduction in the total numbers of bacteria originally present.

It is true that the problem of corrosion had to be met. By acidifying steam with suction injection of gluconic acid in controllable quantities the can is given an acid reaction of approximately pH 6.0 to 6.5, with not only no active corrosion of the can, but actually with protective properties being imparted to any exposed iron spots or surfaces. Subsequently this method of acid rinsing has been tried in a variety of dairy plants with noticeable improvement in the quality of the raw milk and cream transported in these mechanically cleaned cans.

In its search for a non-toxic, relatively non-corrosive, acid to use in the sterilizing steam our quality control laboratory had the help of the P. W. Bonewitz Chemical Co. of Burlington, Iowa, which brought gluconic acid to our attention. We are

further indebted to the Chas. Pfizer Co. of New York, N. Y., manufacturers of gluconic acid, for conducting corrosion studies with a variety of organic acids as a means of selecting the specific acid having the desired properties.

In the corrosion studies, Dr. G. O. Cragwell, technical consultant of the Chas. Pfizer Co., first compared the relative rates of corrosion of iron by aconitic, citric, fumaric, gluconic, phosphoric, tartaric, and tricarballylic acids. In each case, a weighed strip of iron was subjected to the action of 300 c.c. of 0.5 percent acid solution under a reflux condenser. After being subjected to the boiling solution for one hour, the strip was removed from the acid, washed thoroughly, dried and weighed.[1] The losses in weight are given in Table I.

While iron is used in the construction of milk cans, it invariably is plated with a rather heavy coat of tin. Accordingly, tin-plated iron strips representative of the conditions found in milk cans were tested for corrosion rates, similarly to the iron tests just described, with citric, gluconic, phosphoric, and tartaric acids. The results are given in Table II.

These data show that the organic acids tested were not nearly as corrosive to tin-plated iron as they were to iron itself. Nevertheless, the iron data are of interest because they indicate the probable action of these acids upon any exposed iron spots or areas of the milk cans which may develop. By all standards of comparison gluconic acid proved to be relatively noncorrosive when compared with phosphoric, tartaric and citric acids which have been used to some extent by the dairy industry to serve as milk-stone removers.

Tests were also made to determine the corrosive action of phosphoric, tartaric, citric, and gluconic acids on tinned iron strips in which a portion of the tin coating was removed, exposing the iron beneath. Data given in Table II(a) indicate that the relationship among these acids is practically the same as that found in the case of iron alone and iron completely covered with tin.

In our preliminary plant trials, citric acid was used because it was the only organic acid with which we were sufficiently familiar at that time to try out the original can acidification treatments. While it was known to be slightly corrosive, it is not nearly as undesirable as the mineral acids in this respect. A ½ percent solution of citric acid was supplied to an ejector valve (Figs. 1 and 3) attached to the last steam jet on the can washer. When the steam jet was opened, the velocity of the steam sucked up the acid solution and mixed it with the steam to change the reaction of the steamed can from alkaline to acid. The amount of acid mixed with the steam was controlled by a valve in the suction line. To see if the cans were properly acidified, a can was rinsed with 50 c.c. of distilled water following which the reaction of the water was determined colorimetrically with Brom Thymol Blue indicator. A reaction of pH 6.0 to 6.5 was found to be adequate.

The comparative data in Table III serve to indicate that acidulating the steam with a citric acid solution, sufficient to change the reaction of cleaned cream cans from alkaline to acid, resulted not only in significant changes in the types and numbers of the bacteria present in such cans, but also in the odor of the treated cans. They were held overnight after adding 100 c.c. of sterile water to moisten the inner surfaces. Incidentally, 1 c.c. dilutions of the 100 c.c. sterile water used for rinsing and cleaned cans of both acid and alkaline reactions were plated immediately after their delivery from the can washer on standard tryptone-glucose-extract-milk agar and incubated for 48 hours at 37 deg. C. The plates were then counted and the totals reported as standard plate count. Colonies surrounded by a clear zone indicating proteolysis of the milk were reported as the proteolytic count. The plates were then flooded with Brom Thymol Blue indicator solution and the reaction noted and reported as numbers of acid or alkaline colonies. In this manner general types were identified and reported.

After 400 cans had been run through the washer, the cleaning solution itself gave such a high bacterial count that an analysis was made of the solution at different intervals during a day's run to see what chemical changes were taking place. The results are given in Table IV.

The bacteria in the solution appeared to be either proteolytic or alkali-formers in spite of the pH 10 alkalinity and 140 deg. F. temperature. The 170 deg. F. rinse water also

Table III—Effect of Acid Reaction on Cleaned Cream Cans Rinsed With Steam Acidified With Citric Acid

Can No.	Can Reaction	Bacterial Count: Standard Plate	Bacterial Count: Proteolytic	Colony Reaction: Acid	Colony Reaction: Alkaline
5.	Acid (a)	80	30	50	30
6.	Acid (a)	60	30	30	30
7.	Alkaline (b)	360	190	20	340
8.	Alkaline (b)	270	80	0	270
9.	Acid (a)	3	0	0	3
11.	Alkaline (c)	35	2	0	35
Cleaning Solution (e)		(d)	(d)	apparently all alkaline	
Rinse Water (e)		180	15	35	145

(a) Sweet odor in moist can held over night.
(b) Putrid odor in moist can held over night.
(c) Dirty unclean odor in can held over night.
(d) Too many bacteria colonies to count.
(e) Sample taken after cleaning 400 cans.

Cans Nos. 9 and 11 were tested at the start of the day's run.
Cans Nos. 5, 6, 7 and 8 were tested later, after operations had been underway for a few hours.

Table IV—Chemical Analysis of Cleaning Solution in Can Washer During Operation

(Expressed in per cent)

Sample	Alkalinity (as NaOH)	Milk fat	Protein	Total Solids	Ash
Fresh solution	0.25	0.00	trace	0.49	0.11
After 320 cans[1]	0.22	0.18	0.03	0.54	0.20
After 607 cans[1]	0.29	0.34	0.18	0.74	0.16

[1] Cans were used for shipping sour cream.

Table V—Differential Bacterial Counts and General Condition of Cleaned Cream Cans

Treated With and Without Acidified Steam

Date	Can No.	Can Condition	Can Reaction	Bacterial Count: Standard Plate	Bacterial Count: Proteolytic	Colony Reaction: Acid	Colony Reaction: Alkaline
3/23/40	1	old	Alkaline (a)	5	2	3	2
	2	new	Alkaline (a)	24	2	0	24
	3	old	Acid (citric) (b)	5	1	4	1
	4	new	Acid (citric) (b)	14	2	0	14
	5	old	Acid (gluconic) (c)	4	0	0	4
	6	new	Acid (gluconic) (c)	4	4	3	1
4/16/40	1	old	Alkaline (d)	(g)	(g)	(h)	(h)
	2	new	Alkaline (d)	(g)	(g)	(h)	(h)
	3	old	Acid (citric) (e)	(g)	(g)	(h)	(h)
	4	new	Acid (citric) (e)	(g)	(g)	(h)	(h)
	5	old	Acid (gluconic) (f)	3	0	3	0
	6	new	Acid (gluconic) (f)	5	0	4	1

(a) Unclean odor in moistened can held overnight.
(b) Sweet odor in moistened can held overnight.
(c) Neutral odor in moistened can held overnight.
(d) Putrid odor in moistened can held overnight.
(e) Musty odor in moistened can held overnight.
(f) Typical metallic odor in moistened can.
(g) Too many bacteria colonies to count in 1/1000 dilution. No colony growth from gluconic acid treated cans in 1/10 dilution on April 6, 1940.
(h) Apparently all alkaline.

[1] These conditions of temperature and acid concentration were selected because they are analogous to the conditions prevailing in the acidified steam treatment used for changing the reaction of the cleaned milk cans.

showed a positive count of proteolytics and alkali-formers.

Data in Table IV, gives evidence that the accumulation of fat and protein increased with the number of cream cans washed and provided nutrients for the surviving bacteria. The variations in alkalinity and ash can be explained on the basis of solution dissipation and dilution. However, the marked increase in total solids, protein and fat in the sample taken after cleaning 607 cans with the decreases in alkalinity and ash reported seem to indicate that the milkfat or protein complexes formed by reaction with the alkali present contribute to colloidal film formations in the cleaned cans.

With the introduction of gluconic acid as a more economical and relatively non-corrosive substitute for citric acid, an interesting series of tests were conducted as outlined in Table V. A series of new and old cream cans were cleaned early in the day's operation. About 25 cans had been cleaned previously. One set of cans was treated with no acidification of the steam; one set was treated with steam acidified with citric acid; and one set was treated with steam acidified with gluconic acid. Each can was immediately rinsed with 100 c.c. of sterile water and 1 c.c. of the rinse plated on standard tryptone-glucose-extract-milk agar. The differential bacteria counts were reported as in Table V. Each can was then allowed to stand at room temperature in moistened condition for approximately two weeks, at which time differential bacterial counts were again made. Observations on the odor conditions of the different cans were also made at the same intervals.

Data given in Table V suggests that possibly gluconic acid has bactericidal properties not possessed by citric acid. Accordingly, some additional experiments were conducted in which cultures fished from the plates obtained from the can washer cleaning solution were inoculated into sterile water blanks adjusted to pH 5.0 with gluconic acid and then plated directly on standard tryptone-glucose-extract-milk agar with no growth after incubating at 37 and 45 deg. C. Our hopes that we had discovered a new non-corrosive germicidal to replace chlorine products were dashed, however. When the cultures were added to water blanks containing gluconic acid but adjusted to pH 7.0 they all grew profusely, indicating that the bacteria were of the type which apparently grow only in an alkaline or practically neutral medium. Nevertheless, this experience did serve to confirm previous observations that steam acidulated with gluconic acid definitely renders impotent any bacteria surviving the alkaline condition of the cleaning solution used in our can washers. Need for further investigational work is indicated and several experimental stations and agricultural colleges are now following up this development with more critical and exhaustive research than the busy quality control laboratory can provide.

We have, however, extended the practice of rinsing milk cans with steam acidified with gluconic acid with most encouraging results; particularly with respect to the control of milkstone deposits and the elimination of thermoduric microorganisms which can be troublesome in milk procurement, as every dairyman can testify. In any event, a *clean* milk can apparently is one in which the last traces of the alkaline cleaning solution are eliminated. Unless such condition is provided, a film of living microorganisms capable of surviving high temperatures and definite alkalinity is likely to be lying in wait to impair the quality of the milk or milk products subsequently put in such a container. Unfortunately, the film supplies them with the nutrients that only serve to make their detrimental effects more certain. Acidification of the steam used for sterilizing cans provides one solution to the problem that later research may replace with other methods.

In fact, this interesting study involving the final rinsing of cleaned milk cans with acidified steam to leave them in a condition of acid reaction suggests the desirability of reviewing critically all equipment and utensil cleaning practice. An alkaline reaction obviously can lead to complications, as has already been indicated. Then too, there is no doubt that the more spectacular and more easily controlled oxidation of dairy products and other fatty foods by non-living catalysts has eclipsed the more complex action of microbiological

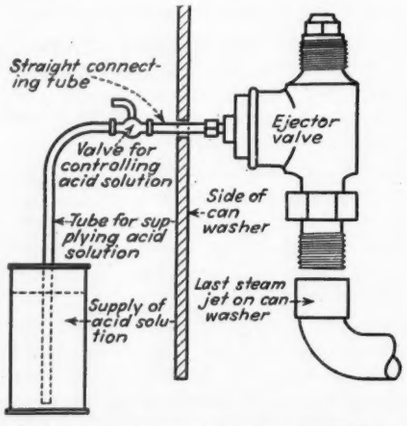

Straight connecting tube
Ejector valve
Valve for controlling acid solution
Side of can washer
Tube for supplying acid solution
Last steam jet on can washer
Supply of acid solution

Fig. 3—Complete acid rinse assembly is better shown by sketch indicating individual units in relation to each other.

oxidases. As Jensen and Grettie (Food Research Vol. 2, p. 97, 1937) have suggested, food manufacturers and their quality control laboratories could do well to give greater consideration to the oxidative as well as to the hydrolytic rancidity effects induced by microbial activity in fatty foods.

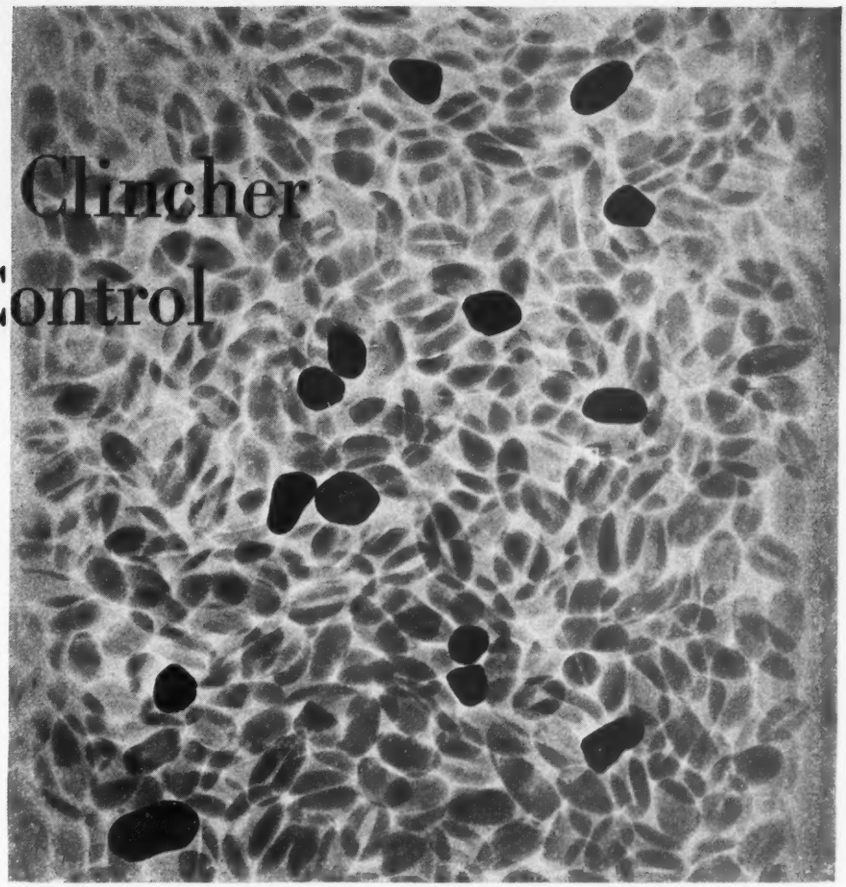
Relatively little attention has been paid to the "oxidizing capacity" of microorganisms in relation to the quality impairment of dairy products. We refer not only to the "cappy" flavor of low count milks, but to the surface taints in butter as well as the off-flavors in cheese—all of which have been incidental to the advancement of super-sanitation in these industries. Castell and Garrard (Food Research Vol. 5, p. 215, 1940) have recently reported that "the spoilage microorganisms involved demonstrate definite oxidizing properties. Organisms of the *Pseudomonas* and *Achromobacter* genera are the most strongly oxidizing types; those belonging to *Alcaligenes* and *Brucella* are somewhat less, although still strongly positive; members of the *Aerobacter, Escherichia,* and *Proteus* are weakly positive, variable or negative; the *Bacilli* also vary from weakly positive to negative; while the *Cocci* and only *Anaerobe* studied by these investigators were definitely negative. It is also interesting to note that all organisms which were found to be strong oxidizers were Gram-negative, while those which definitely were not strong oxidizers were Gram-positive."

With sanitarians bending every effort in their programs to eliminate, or at least minimize, natural types such as the lactis group normally found in fresh raw milk and with the growing realization that the strong-oxidizers, such as some of the *Achromobacter* and *Pseudomonas* types whose normal habitat is water and soil, have varying resistance to the chlorination of water supplies, we are apprehensive lest super-sanitation is engaged in "upsetting the balance of Nature." We are finding that some of the influences in the quality impairment of dairy products are actually being enhanced by the scrupulous efforts for sanitary perfection. While we do not infer a return to "the horse and buggy days," we definitely are of the opinion that more attention must be paid to the final freedom of cleaned equipment from films bearing spoilage types of microbes and nutrients for their subsistence and subsequent "hell raising."

Acknowledgment is made to Mr. G. W. Shadwick, Jr., for the experimental data in Tables III, IV, and V, as well as for the photographs with which this article is illustrated.

X-RAYS Put Clincher On Quality Control

Expose foreign materials and certain defects that get by regular inspection. Method practical and inexpensive.



Small stones and dirt balls in a tray of peanuts as they look on the fluorescent viewing screen of an x-ray inspection machine. To the unaided eye, some of the foreign particles are entirely invisible, because they are covered up, while others are difficult to distinguish because their size, shape and color are too close to that of the nuts.

TIME was in the food industry when careful inspection of products up to the time they were put into the container was enough. But in the last few years some of the progressive production managers of the industry have carried quality control a step further. Inspectors are now "taking a peek" through the food after it is in the container—"looking" through container, food and all. The purpose of this final peek is to find any packages containing foreign material, such as stray nuts, stones or pieces of glass, or any slack-filled packages. The peek is made possible by the x-ray inspection machine designed especially for production use.

And x-ray inspection for foreign materials is not limited to packaged products. The method is applicable to diced fruits, diced vegetables, beans, spinach, nuts, berries, candy, oysters and clams in bulk, to whole berry pies, to meat and to sausage.

Moreover, x-ray inspection has other uses in the food industry than preventing slack-filled containers and packages containing foreign material from reaching consumers. It shows up physical defects inside the food itself in some cases. It enables the girl on the inspection belt to "see" hollow hearts inside potatoes, carrots and onions and to detect frost damage, crystallization, blossom-end decline and puffiness inside oranges, lemons, limes, grapefruit and tangerines.

In fact, x-ray inspection's most spectacular performance has been in the citrus industry for the detection of frost damage. More than 2,500,000 boxes of merchantable fruit that otherwise would have been lost was salvaged by California Fruit Growers Exchange after a severe freeze in 1937. And this saving was made at small cost, for x-ray inspection is as inexpensive as it is practical, as will be shown later by figures.

FOOD INDUSTRIES got its information on x-ray inspection from those who use it. So let us take you on a verbal tour of some of the plants where it is in operation. First we go to the Larson Co., Green Bay, Wis. This company x-rays its "Veg-All" mixed vegetable product. Inspectors look for metal machine parts, such as dicing knives, and for small stones in the cans. One operator peering into the machine looks right through can and contents at a rate of 350 cans a minute. After 15 minutes at the machine, the inspector leaves and another girl takes her place, the work being done in quarter-hour shifts. When not x-raying cans, an operator is busy at some other task in the plant.

We ask about the maintenance cost on this x-ray machine and learn that the tube now in the machine has been

This article on
QUALITY CONTROL
Is of practical value to
All Food Manufacturers

Because it reports actual experience of several food manufacturers with x-ray inspection. This method of inspection has proved 98 percent effective in catching foreign materials missed in regular inspection. It has reduced insurance claims arising from foreign materials in food. And it has avoided huge losses of raw material in one industry. Its possibilities have only been scratched.—The Editors.

Pictures are by courtesy of General Electric X-ray Corp., except the one showing tin cans, which is an Acme picture, and the one of the inspection of "Sunkist" oranges, which is from California Fruit Growers Exchange.

in service for 4,000 hours. The management tells us that the x-ray inspection has been very effective in detecting foreign materials.

So far this operation looks eminently practical, and looking for a catch in it somewhere, we inquire if the method does not have some disadvantages. We get an emphatic "No!".

Now we go to the plant of a nationally known candy manufacturer. Here we see fancy packages of chocolates passing through two x-ray machines at a rate of 10,000 one-pound boxes per day. The candy goes directly from the packing belt through the x-ray unit and onto to the tying belt in continuous flow. The inspectors look through the boxes in search for foreign materials. For the management says that in spite of all other precautions, a small sliver of wood or other foreign substance may get into the product—and of all the things that make a consumer mad, biting down on a sliver of wood in a fancy chocolate makes her the maddest. And if she is inclined to be mercenary, it gives her a chance to sue the candy manufacturer for dental damages. But x-ray inspection is 98 percent effective in eliminating such unhappy events.

This candy manufacturer has been operating x-ray machines about as long as anybody in the food industry, so we ask him something about costs. The management tells us that the original equipment and installation of the latest machine set them back about $1,800. They put tube replacements at $200 a year; electrical energy at about $15 a year; and maintenance at between $100 and $125 a year. Labor cost per machine amounts to the wages of one girl in the plant. The inspectors get the same pay as packers; in fact they are packers that work on an x-ray machine for a two-hour stretch and then go back to packing.

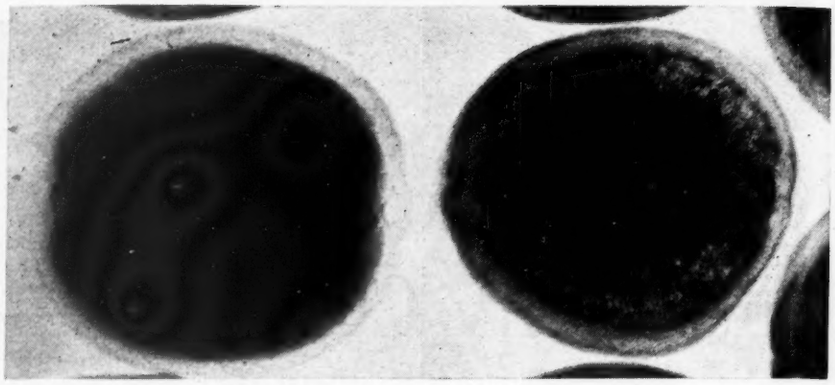
X-ray inspection has proved effective in reducing insurance claims caused by foreign substances in the product, this company reveals. And it finds no disadvantages to the method, although it has had it in operation for several years.

That plant "visit" was rather enlightening, and now we look in on another candy manufacturer — Peter Cailler Kohler Swiss Chocolates Co., Inc., Fulton, N. Y. Here we see almonds and filberts undergoing x-ray inspection following hand picking and before the nuts are used in chocolate bars. Apparently hand pickers do miss some bits of foreign material on occasion. And x-rays detect objects which escape the human eye. But, what's this! A piece of shell gets by the x-ray machine and so does a shriveled nut. Unfortunately, the manager says, the x-rays do not show up pieces of shell which occasionally are imbedded in the meat when cracking the nuts. Nor does it distinguish a shriveled hard nut.

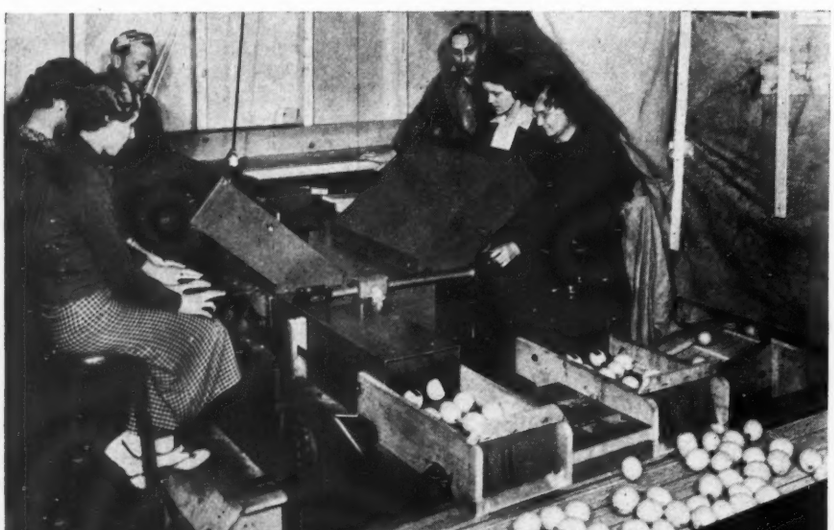
We ask what prompted the management to adopt x-ray inspection in this plant. We learn that a general study of foreign inclusions showed that screening of plain chocolate removed occasional foreign matter which was not magnetic and could not be caught by magnets, but that nuts were a source of some foreign matter which got by the hand pickers. X-ray inspection has practically eliminated all inclusions up to molding. The management sees no disadvantages in this method of quality control. To avoid the very remote possibility of x-ray leakage, dental films are continuously located near the machine and attached to the attendant's clothes. No evidence of leakage has ever been noted.

One girl looks through 1,800 lb. of almonds an hour as they pass the x-ray machine, and a general helper fills the hopper as needed and removes the inspected nuts. The price of the equipment was $2,300.

While on the subject of nut inspection, let us see what's done at Planters Nut & Chocolate Co., Suffolk, Va. Here, salted peanuts, chocolate-covered peanuts and peanut candy are being x-rayed for foreign materials—metal and stones—and occasional lumps of salt. The inspection is 98 percent effective in eliminating those objects which ordinary inspection occasionally passes to the finished package.



While bad citrus fruit may look like good fruit to the eye, it is easily distinguished on an x-ray viewing screen. A good orange is shown at the left as an image of uniform density. The mottled image on the right shows crystallized fruit.



The citrus fruit industry uses x-ray inspection on a big scale. Here "Sunkist" oranges are being examined to eliminate frost damaged or "dry" fruit. X-rays pass through the fruit as it goes by on conveyors, then strike a fluorescent viewing screen and produce an image of the insides of the fruit. The girls sidetrack bad oranges onto another conveyor by operating hand levers.

Planters operates two x-ray machines in Suffolk and one in San Francisco. The operator on each machine inspects 2,200 boxes an hour, each containing 24 five-cent bags of peanuts. The cost is "negligible", and there are no disadvantages to the method.

As we said before, the citrus industry does more with x-ray inspection than any other food industry. In California, 55 associations, members of California Fruit Growers' Exchanges, employ x-ray inspection. It was these growers who salvaged more than 2,500,000 boxes of fruit from the freeze of 1937. They inspected over 7,000,000 boxes of fruit that season. The practice, however, is to x-ray the citrus fruit only when there is frost damage or internal physiological defects such as crystallization, blossom-end decline or puffiness. It is not necessary to x-ray the fruit unless these conditions exist.

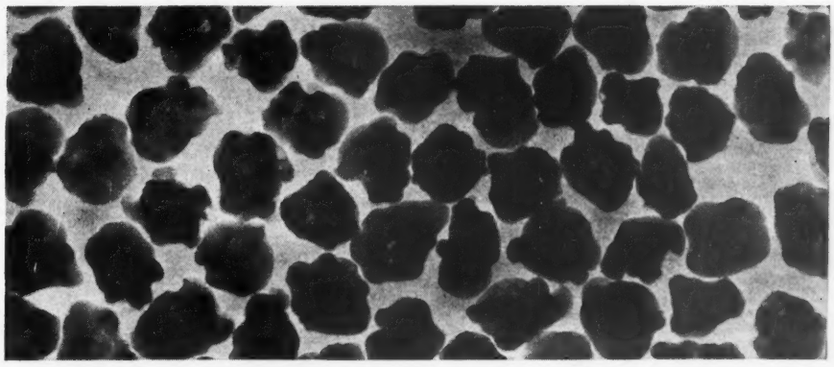
The California citrus industry adopted x-ray inspection through a desire to market a quality product, to give consumer satisfaction and to avoid having to discard large volumes of fruit because a small amount of it was not siutable for marketing.

Florida citrus growers have likewise found the x-ray machine a tool that pays big dividends. Equipment installed after the freeze last winter has paid for itself many times over by salvaging good fruit from crops damaged in spots by the freeze.

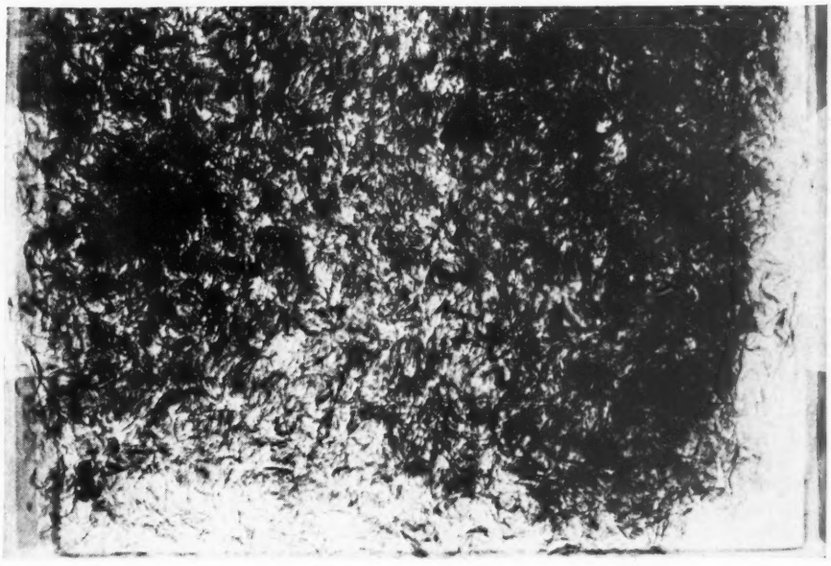
Other products to be x-rayed in the food industry are pitted cherries—inspected for pits—and frozen blueberries, examined for stones or other foreign matter which might be present in the product.

IF you've read this far, you are probably sufficiently interested in the x-ray machine to want to know how the thing works. Its operation is based on the principle that while x-rays will pass through all common materials, they pass through some more readily than others. And when the x-rays pass through a food product (in or out of a container), an image of the product is produced in visible light on a fluorescent screen. And if foreign material, or certain defects are present in the product, these show up as dark or light spots on the screen.

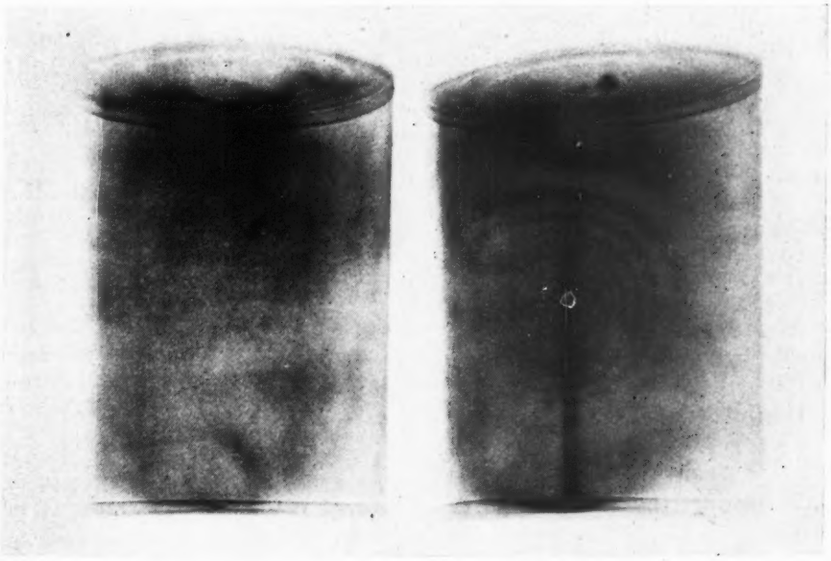
The inspection machine consists basically of an x-ray generating unit, a fluorescent viewing screen, a conveyor which carries products continuously between the x-ray tube and the fluorescent screen, and a manually operated device for rejecting bad packages or products. The unit is so constructed that there is no danger to operators from electrical shocks or from x-ray burns. It takes 1½ kw. of electrical energy.



A copper wire and a small stone inside pieces of candy can be seen on the x-ray screen here. The candy is passing through the inspection unit in a continuous stream on a conveyor belt.



Here are the innards of a box of breakfast cereal as viewed with an x-ray inspection unit. A small machine screw and a piece of glass are visible, neither of which would be appreciated at the breakfast table.



Bits of metal in cans of food show up as dark spots on the fluorescent screen of an x-ray inspection machine. X-ray inspection of food in metal containers is more difficult and not as satisfactory as with food in other containers because foreign materials do not show up so well.

Containers and part of equipment used in controlling gas mixtures and in studying their effect on the metabolism of the apple.

Progress Made in GAS STORAGE Of Fruits, Vegetables

Use of modified atmospheres keeps products in better condition, for longer period, with less refrigeration.*

By H. H. PLAGGE
Iowa Agricultural Experiment Station, Ames, Iowa

REFRIGERATED storage of fruits and vegetables in artificial gas mixtures has been investigated as a substitute for the standard refrigerated method of preserving these products. Storage in artificial gas mixtures is based on the principle that lowering oxygen content and increasing carbon dioxide content decreases respiration and delays ripening of stored products.

The gases used in storage in modified atmospheres are those contained in normal air; i.e., oxygen, nitrogen and carbon dioxide. Air, a mixture of these gases, with traces of others, has the following approximate composition:

Nitrogen	79.00 percent
Oxygen	21.00 percent
Carbon dioxide..	.04 percent

How is the composition of the atmosphere with respect to oxygen and carbon dioxide changed? The simplest method is to make the storage room air-tight and ventilate it just enough with fresh air to maintain a certain carbon dioxide-oxygen ratio. It is possible to do this because fruits and vegetables give off carbon dioxide (CO_2) in respiration, while they take up or consume oxygen (O_2). The basic equation for the respiratory exchange of these two gases is as follows:

$C_6H_{12}O_6 + 6\ O_2 = 6\ CO_2 + 6\ H_2O$ + heat
(Glucose sugar) + (Oxygen) = (Carbon dioxide) + (Water) + heat

From this equation it is evident that the six parts of CO_2 that are produced are balanced by the six parts of O_2 that are used from the atmosphere. The reason for the replacement of the oxygen of the air with carbon dioxide in an air-tight chamber or storage room with fruit can thus be explained.

The method of sealing storage rooms tight and ventilating with fresh air is satisfactory for combinations of oxygen and carbon dioxide when the sum of their concentrations equals 21, the percentage of oxygen in normal air. For other concentrations such as 5 per cent O_2 and 8 per cent CO_2, it is necessary to remove part of the

*Journal paper No. J-727 of the Iowa Agricultural Experiment Station, Ames, Iowa.

carbon dioxide, and, at the same time, limit the oxygen by restricted ventilation. Carbon dioxide is removed by absorbing a part of it in chemicals such as caustic soda. The atmosphere of the storage is circulated over or through the chemical at a rate sufficient to maintain the desired concentration of carbon dioxide. Ventilation with fresh air is carried on at the same time to maintain the oxygen content at a definite percentage. The percentage of nitrogen makes up the difference between the sum of the percentages of carbon dioxide and oxygen.

Another method of maintaining oxygen and carbon dioxide concentrations is that of mixing the pure gases —carbon dioxide, nitrogen and oxygen —in definite proportions by controlled methods and allowing the mixed gases to enter the air-tight storage chamber. The use of dry ice to enrich the carbon dioxide content of storage rooms has also been used experimentally.

Equipment for Storage in Modified Atmospheres

The simplest type of gas storage is a storage room that has been made air-tight and one that is ventilated with air through a small opening. A construction used at the present time in England[9] includes lining roof and walls with galvanized sheet metal. The metal sheets are nailed or screwed into place with an overlap of about two inches and the joints are sealed with vaseline or some other suitable material. Composition sealing materials impermeable to carbon dioxide are on the market.

The floor, usually of concrete, is surface-treated with a material to make it gas-proof and give a smooth working surface that is easily cleaned. The door is made of suitable gas-tight material and fitted with suitable casing seals. The storage is insulated, since refrigeration is required as in cold storages. Storage rooms are never entirely air-tight and leakages even higher than 6 per cent per day occur and may not be objectionable.

For a 2,000-bu. storage an opening one foot square for ventilation is considered sufficient. An opening this size makes it possible to remove samples of fruit for examination. In storages having forced circulation, sufficient ventilation can be obtained by using a ¼ in. open pipe placed through the wall on the suction side of the fan. A finely adjusted valve can be used to regulate the flow of air into the storage.

When independent control of oxygen and carbon dioxide are required (for certain apple varieties), it is necessary to absorb some of the carbon dioxide by passing the atmosphere over or through a strong caustic solution, such as sodium hydroxide. This process is sometimes termed "scrubbing" the atmosphere.

This article on

PERISHABLE-FOOD STORAGE

should be read by

All Food Manufacturers

Because increase in the carbon dioxide content of the atmosphere in food storage rooms, together with decrease in oxygen content, is often a means of improving quality and reducing costs. While much of this work has been done in England (see Food Industries, Vol. 8, pages 290, 446, 571; 1936), the United States is beginning to experiment actively with gas storage. Progress made to date is set forth in this article. While most of the work reported here applies to fruits and vegetables, the method is also being carried out with meat, poultry, fish, eggs and dairy products.

Advantages of Storage in Modified Atmospheres

The principal reason for the use of gas storage is that it slows down ripening considerably and therefore lengthens the storage life, as compared with cold storage in air. With certain apple varieties, data indicate that the fruit in gas storage maintained about the same hardness that it originally had throughout a period of seven months.[8] Another reason for using the gas treatment in apples is that original green ground color present at picking time is better preserved in storage and that flavor remains normal over a longer period. Mealiness and decline in flavor and juiciness are definitely postponed longer than with usual cold storage fruit. Gas-stored fruit when placed on sale is firmer, has lighter ground color and "goes mealy" slower than fruit stored the conventional way.

The English investigators have indicated that the low temperature disease, soggy breakdown, in apples is controlled by this method since storage temperatures used are high enough to avoid the trouble.[9] The storage temperatures used for apples in gas storage usually range from 34 to 40 deg. F., depending on the variety. Since storage temperatures with gas storage are higher, the cost of operating refrigerating equipment is lower. However, this may or may not be offset by the additional cost of the gas storage building, depending upon circumstances. It has also been determined that increased concentrations of carbon dioxide in storage tend to inhibit the growth of molds and rots.

Mealy breakdown in Northwestern Greening apples, a condition occurring in apple storage. The usual manifestation of this disease in this variety is the browning of pulp cells near the core region. A decided tendency toward mealiness, and a bursting of outer peripheral tissues commonly accompanies browning when storage temperatures are too high. When the carbon dioxide content of the atmosphere in the storage is increased, ripening and appearance of mealy breakdown are delayed.

Disadvantages

There are certain disadvantages of gas storage. The chief disadvantage is that it is difficult to construct an air-tight building. In the best constructed gas storage buildings, the leakage is about 6 percent of the volume per day.[9] At the present time building specifications appear to be incomplete and definite information on construction is lacking. Another obstacle to the development of gas storage is that various types of products and varieties of the same product require different gas mixtures. This necessitates providing

separate storage rooms for different products. All apple varieties cannot be stored in the same storage chambers. A few apple varieties are considered unadapted to storage in gas mixtures.

Because gas storages are kept sealed throughout the season, it is not feasible to enter the storage until time to dispose of the crop. Because of the relative high concentrations of carbon dioxide, it is not possible to work in gas storage rooms while they are being operated. This is another reason for constructing small storage rooms; viz., that small storage units can be operated more effectively than large units and less fruit has to be disposed of in a given time. Because of restricted ventilation, apple scald is more likely to develop and use of oiled paper is emphasized in this method of storage.

Results of Investigations

Soon after the World War, the English investigators, Kidd and West, worked on the method of storing fruits and vegetables in artificial gas mixtures. They obtained favorable results with different products, but centered most of their attention on apples. They first worked in ordinary apple storage rooms using glass-fronted wooden chambers fitted with openings for ventilation and admitting gas mixtures.[7] Later the experiments were carried on in a larger scale. Their work progressed from year to year and during recent years was taken up by English commercial growers and storage operators rather rapidly. In 1937, it was estimated that the refrigerated gas storage space in England amounted to 3,000,000 cu.ft., sufficient to store about 1,200,000 bu. of apples.[10] In contrast to this, in the United States there are probably no commercial gas storages to date.

However, investigators in the United States and some other countries have taken interest in refrigerated gas storage, not only for fruits and vegetables, but for some other food products as well. In Canada, two experiment stations, the Central Experimental Station at Ottawa and the Summerland Experimental Station in British Columbia, have been active in investigating the gas storage of apples. During the past year at the Iowa Agricultural Experiment station, D. V. Fisher, a staff member of the Summerland station, conducted research work on a gas storage problem. Australian and South African investigators have been investigating the problem.

At the California Station, Allen and McKinnon[1] found that with controlled percentages of carbon dioxide and oxygen, the softening and coloring of Yellow Newtown apples could be prevented without loss in flavor and at temperatures high enough to inhibit internal browning. Further studies by Allen and Smock[2] of the same station substantiated earlier results. They state:

"Four seasons' results in holding Yellow Newtown apples in CO_2 atmospheres have shown that in a CO_2 concentration of 10 percent, at a temperature of 45 deg. F., the fruit can be held approximately as green and as firm as in 32 to 36 deg. air. All internal browning is avoided at 45 deg. F."

Similar results were reported with Yellow Bellflower apples and with Bartlett and Hardy pears. Experiments with plums and peaches stored at 45 deg. F. in carbon dioxide also showed marked beneficial effects.

Smock and Van Doren[13], working at the Cornell Experiment Station, have reported results of gas storage on Northwestern Greening and McIntosh apples. For both varieties, a temperature of 40 deg. F. and an atmosphere containing 5 percent CO_2 and 2.5 percent O_2 gave good results. McIntosh and Northwestern Greening, with these storage conditions, were still marketable on April 29, whereas similar samples held in air at 36 deg. F. were of poor quality.

Recently, investigators[14] at the Minnesota Experiment Station have studied the possibility of improving the shipping capacity of raspberries and strawberries by giving them short carbon dioxide treatments of high concentrations before shipment. It was concluded that treatment of fresh berries with carbon dioxide improved shipping quality, reduced spoilage when sold on the local market, and increased the time the fruit could be held in marketable condition.

Other investigations have been reported by the United States Department of Agriculture. Recently Gerhardt and Ezell of the Federal Laboratory at Wenatchee, Wash., published results showing the advantages of gas storage for Bartlett pears and sweet cherries.[5, 6] Storage of Bartlett pears at 45 deg. F. for 20 days in 20 percent CO_2, or for 30 days in 35 percent CO_2, resulted in about the same potential storage life as that of fruit stored at 32 deg. F. immediately after harvest. Within the present year, Gerhardt and Ryall[6] reported on results with sweet cherries, and stated:

"Gas tolerances have been evaluated for the storage of cherries at different temperatures for varying periods of time. Bing and Lambert varieties can be held in carbon dioxide without impairment of flavor as follows: At 60 deg. F. for 12 days in 40 percent; at 45 deg. F. for 10 days in 75 percent (Bing only); at 45 deg. F. for 20 days in 40 percent; at 45 deg. F. for 17 days in 25 percent (also Napoleon and Royal Ann); at 32 deg. F. for 31 days in 10 percent. The Napoleon variety was more sensitive than either Bing or Lambert to higher concentrations of carbon dioxide."

In firmness, brightness, freshness and freedom from decay, storage of sweet cherries in 25 percent carbon dioxide at 45 deg. F. is preferred to air storage at 32 deg. F.

Brooks, Miller, Bratley, et al,[4] investigated the effect of short-period gas storage, such as might be used in refrigerated cars, as a possible substitute for precooling. In summarizing a part of the results, they point out that control of diseases and other forms of spoilage are readily accomplished with carbon dioxide, but the effect of the gas upon the flavor of the product sets definite limitations to this treatment. The most serious limitations were found with peaches, apricots, strawberries, and red raspberries. Plums, cherries, blackberries,

(*Turn to page 106*)

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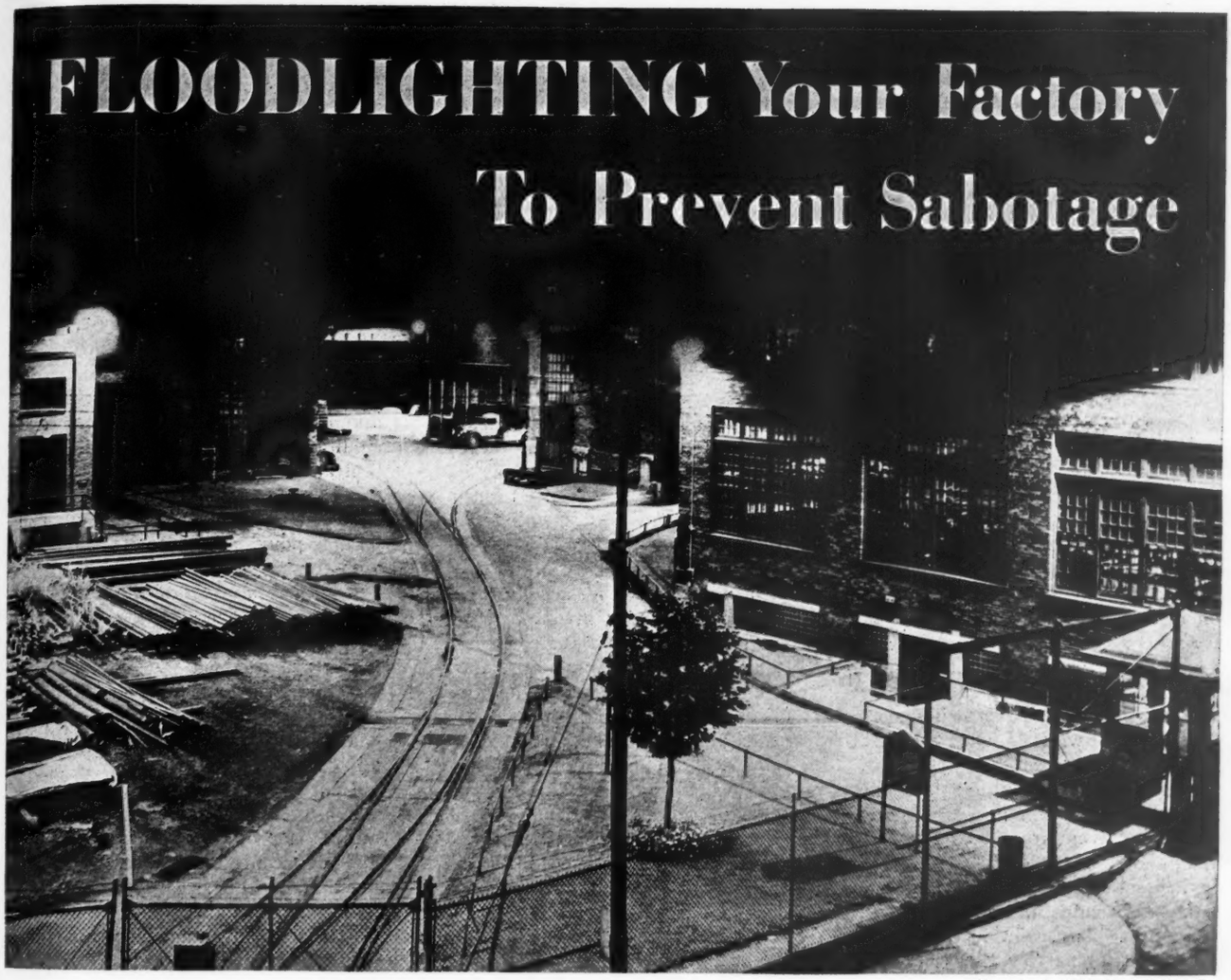
FLOODLIGHTING Your Factory To Prevent Sabotage



Courtesy Benjamin Electric Mfg. Co.

Intruders will find it difficult to get into this plant at night without being detected by guards. There are no shadows or dark spots to afford them protection, thanks to properly engineered floodlighting.

Bright illumination on grounds first defense against intruders. Saboteurs active in peacetime

AMERICAN industry must protect itself against sabotage if it is to perform its vital role in national defense. And experience of the last war shows that a great proportion of the acts of sabotage were committed prior to our declaration of war. Which means that industry must be on its guard, starting now.

One of the first and most important protective steps for industrial plants to take is to floodlight the factory grounds at night. The FBI has recommended this precaution. And World War experience showed that light is industry's first line of defense against sabotage.

When you brightly illuminate your property, you erect a barrier through which no intruder can safely pass. Light deprives the saboteur of the protection of dark corners and deep shadows upon which he relies.

A first consideration in floodlighting factory grounds is to use light to enchance the protection afforded by a fence around the property—fencing is important because the more difficult the entrance the more conspicuous the intruder becomes. A properly lighted fence not only reduces the number of guards required but simplifies patrolling. If guards are at fixed stations it is often feasible to so locate these stations that their area of visibility is greatly increased. It is desirable where possible to have guards located in shadow so that the intruder cannot know their location and so that they may see the intruder easily. The visibility of distant points is materially affected by the amount of light in the immediate vicinity of the guard, for if he is standing in a lighted area more light must be provided at the distant point to provide equal visibility.

The conventional way of lighting a fenceline is to place a narrow-beam 1,000-watt floodlighting projector at each corner and place additional projectors approximately 300 ft. apart. The projectors should all be aimed in the direction in which the guard is patrolling, so that the light does not shine in his eyes.

Local conditions, such as the type of fence, the location of the guard, the method of patrolling, the size of the yard, the location of the buildings and the surroundings of the yard may make a different system of lighting more effective. If buildings are close to a fenceline it may be desirable to place the floodlighting projectors on the roofs of adjacent buildings and light the area up to, as well as beyond, the fence. If there is a wire fence and the guard is patrolling inside the

fence," it may be desirable to use a wider beam projector and direct most of the light outside of the fence so that the edge of the beam is along the fenceline. This leaves the guard in relative darkness and provides a wide space outside of the fence in which he can observe any intruder. If the fence is opaque it should be painted white, thus an intruder will stand out in bold silhouette against the light background. In other places as well it often is possible to lighten backgrounds which help the guards to see an intruder in silhouette.

In some cases, particularly in small yards, it is entirely feasible to light the fenceline by means of local units spaced 50 to 75 ft. apart. The units should be mounted high enough so that a passing person cannot easily reach up and hit the lamps with a club, putting a section in darkness. It is necessary to place units sufficiently close together so that there is no large section in darkness to provide a place of easy access for an intruder if one lamp is broken or burned out. Close spacing is also desirable to provide the coverage necessary to reveal intruders in fog and bad weather when they are most likely to operate.

While the boundary fence is the first line of defense, there are many vulnerable areas around a property which should receive careful study to provide satisfactory lighting. Some of the most vulnerable of these are: (1) Spaces along railroad tracks and highways; (2) narrow alleys between buildings; (3) narrow spaces between buildings and fencelines; (4) all entrances to yards; (5) entrances to important buildings; (6) areas where there is concealment, such as shrubbery or outbuildings; (7) near to the fenceline; (8) streets that dead-end at the property line.

If there is a number of freight cars parked in the yard, this is a location which should receive particular attention, because it provides a rallying point where a large group may be concealed and from which they can make sallies to do their destructive work. Piles of lumber or stacks of other material around the yard may cause a shadow in which an intruder can find shelter and wait for the opportune time to strike. In spots like this small fires may be started for the purpose of distracting attention from other locations where greater depredations are planned.

Reproduced on the accompanying diagram is a typical layout of a medium size industrial plant comprising an office building, several large warehouse and manufacturing buildings and several small buildings for miscellaneous purposes. The plant property is enclosed on four sides by a fence and is located fronting on a main highway with a railroad along one side and a spur track into the yard.

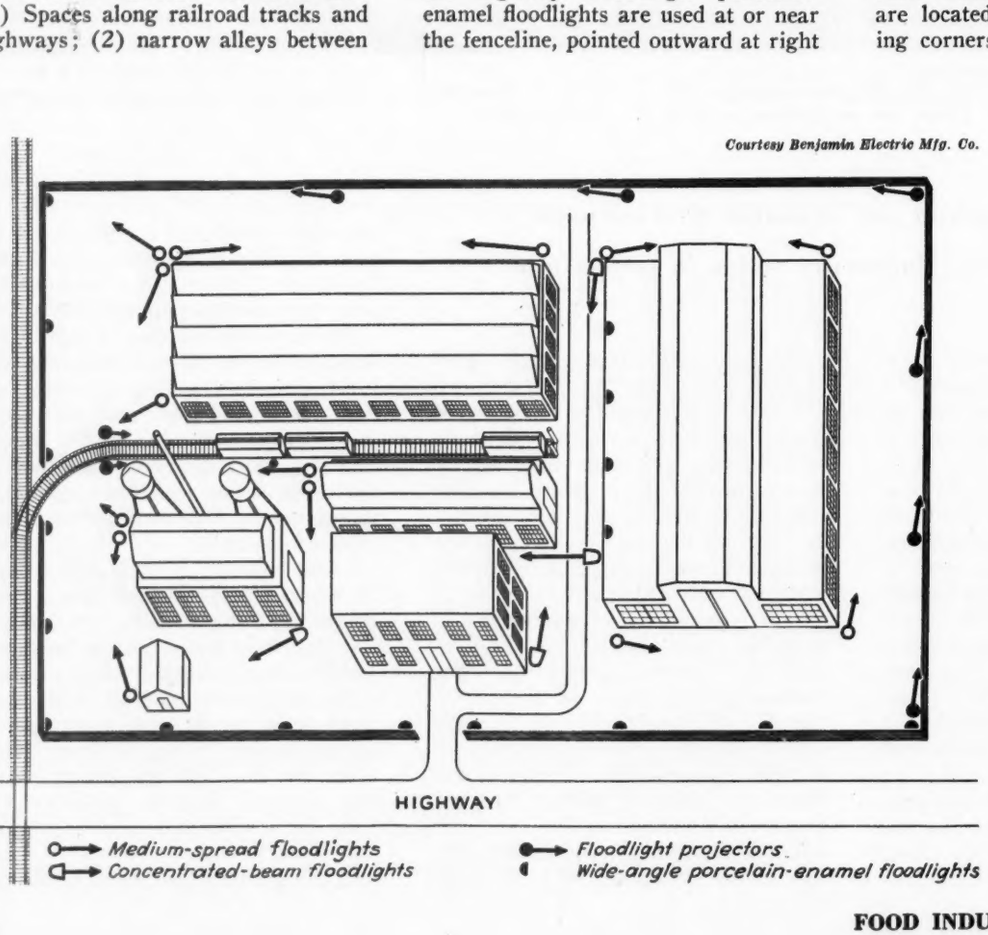
The primary problem in lighting this layout is fence lighting. Along the highway wide-angle porcelain-enamel floodlights are used at or near the fenceline, pointed outward at right angles to the highway and directed downward to reduce the possibility of glare to passing motorists. These floodlights are also used along the fence paralleling the railroad and are similarly aimed and directed to minimize glare. Floodlight projectors are indicated along the other fence lines where no glare problem is present. They should be concentrated-beam types and directed nearly parallel with the fence.

Particular attention has been given the spur track and its alley between the buildings; floodlighting projectors are recommended to throw light the length of the spur and brilliantly illuminate its gate through the fence. Additional medium-spread and concentrating-beam floodlights are indicated on the building corners near the spur entrance—one of the most vulnerable points in the entire plant layout—for maximum protection.

The factory street on the right-hand side of the office building is lighted with concentrating-beam floodlights which are directed the length of the street from each end. Additional lighting is provided here by porcelain-enamel floodlights on the roof of the adjacent building.

General yard lighting, for protection as well as to facilitate night operations, is provided by medium-spread and concentrating floodlights—depending on the size of the area and their distance from it. Floodlights are located advantageously on building corners and directed as required.

Courtesy Benjamin Electric Mfg. Co.



Protective floodlighting system for a typical medium size industrial plant. Location, direction and types of floodlights are indicated. All of these factors are important.

INDUSTRIAL DERMATITIS —It Costs You Money

This occupational disease accounts for 65 percent of all compensation claims caused by industrial disease. The food industries stand fourth in frequency of occurrence. Here's what to do about it.

CASES of industrial skin diseases are being reported with increasing frequency and now are the basis of some 65 percent of compensation claims based upon occupational diseases. And this in the face of decreases reported in other occupational diseases.

Dermatitis, that is, a dermatosis or skin disease caused by inflammation of the skin, is by far the most frequent industrial disease, but the compensation cost and disability time per case is lower than for most other occupational diseases. For example, dermatitis caused 49 percent of all occupational disease awards in New York State in 1937, with an average compensation cost of $159 per case and an average of 13 weeks disability time per case. All other occupational diseases averaged a cost of $347 per case and a disability time of 40 weeks.

Frequency of occurrence makes these losses of time and money serious, in spite of their being lower than for other occupational diseases. Because of this, and also because dermatitis is largely preventable, FOOD INDUSTRIES wishes to bring to its readers' attention certain information on industrial dermatitis that has been reported by the Committee on Healthful Working Conditions of the National Association of Manufacturers. The facts in this article are taken from that report.

Of the eleven major industries in the United States, the food industries show the fourth greatest number of cases of industrial dermatitis. Primary causes of dermatitis in the food field are contact of the skin with dusts; alkalis and their compounds; and plant materials such as vegetables, cereals and so on.

Industrial dermatitis is the result of:

1. Primary irritants, such as strong acids, strong alkalis, metallic salts, strong soaps, which are likely to affect all exposed workers equally.

2. Secondary sensitization (sensitiveness), dependent on an acquired supersensitivity of an individual's skin to a particular substance, even in weak concentration.

The actual character of the skin reaction is individual in each case and may not be indicative of the type of irritant or sensitization of the person. Also, the skin reaction may be complicated by an industrial skin disease superimposed on a dermatotis which is not of industrial origin.

Dermatitis may develop on first exposure to a strong concentration of a primary irritant, or prolonged exposure to a weaker concentration of the irritant. Dermatitis caused by secondary sensitization develops usually after a period of exposure, and during that period the individual will show no dermatitis unless the concentration of the irritant becomes so high as to act as a primary irritant. Once sensitized, however, the sensitization dermatitis will appear on contact with very minute amounts of the substance and will develop from concentrations that in no way affect a normal person.

Primary dermatitis is somewhat less frequent among dark-skinned types and negroes. It is more frequent in hot weather, is usually easily cured, and has a short disability time.

Secondary sensitization dermatitis is such less frequent than the primary type, but may develop in any skin type and color. It is usually cured with difficulty and tends to cause a long and expensive disability. Also, severe cases frequently become sensitive to many other substances, not only at work but also outside, and become a re-employment problem. The sensitization may develop on first contact with an irritant, or only after months or years of exposure, though usually there is an interval of from seven days to a few weeks of contact before the appearance of the dermatitis.

Early treatment by an experienced physician or dermatologist can materially reduce the extent and disability of the dermatitis in either primary irritative or secondary sensitization cases.

Prevention of Primary Irritative Dermatitis

Methods to be followed in the prevention of primary irritative dermatitis can be listed under the following heads:

1. Maintenance of pre-employment and periodic physical examinations.
2. Prevention of contact of worker's skin with irritant by:
   - *a.* Capture of irritant fumes or dusts at source by exhaust ventilation hoods, or use of totally enclosed equipment where possible.
   - *b.* Use of acid and alkali resisting gloves, aprons and protectors.
   - *c.* Use of impervious pastes and creams on exposed skin.
   - *d.* Use of clean, dust-free lockers that keep work and street clothes separate and use of clean work clothes.
3. Substitution of non-irritant for irritant substances in production, if possible.
4. Maintenance of good skin hygiene by:
   - *a.* Free use of bland soaps or cleaners, with adequate water, at convenient basins or showers, before and after work, as uncleanliness of skin is greatest predisposing cause of dermatitis.
   - *b.* Avoidance of improper cleanser for use by men after work (no gasoline, turpentine, fat solvents, strong alkali, or abrasive soaps).
5. Investigation of any skin irritation and endeavor to correct it as early as possible, no matter how slight the case.

Prevention of Secondary Sensitization Dermatitis

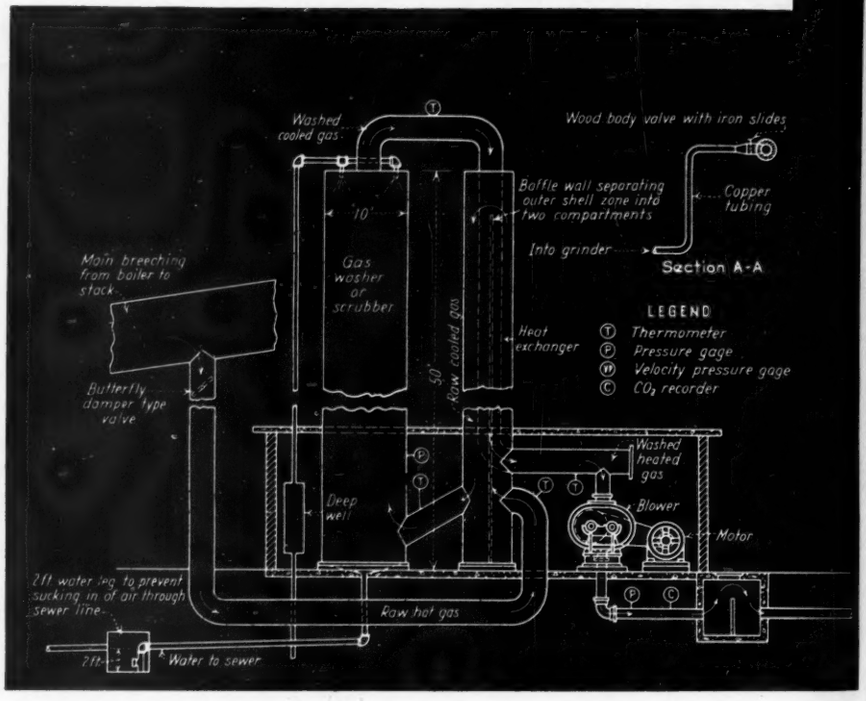
Much can be done to prevent secondary sensitization dermatitis by the following methods:

1. Prevention of primary irritant dermatitis.
2. Operation of skin-hazardous processes by men with normal or resistant skin, preferably without history of eczema and skin disease.
3. Substitution of materials of low sensitizing power for known sensitizers where possible, and observation of effects of all new compounds used in production.
4. Education of foremen, or men, in methods of prevention.
5. Removal of man from exposure as soon as it is definitely found that he cannot get well ("hardened") under treatment while working; and if necessary to remove man from work for cure, return him to a non-skin-hazardous job, if possible.
6. Secure medical consultation on cases, especially if believed to be due to sensitivity.

DUST EXPLOSIONS Avoided By Use of Boiler Flue Gas

Replacement of atmospheric air in high-speed, cereal grinding mills by washed and dried flue gases lowers oxygen content of dust-laden air so that neither fire nor explosions take place

By R. O. KIRN *
Chief Engineer, Quaker Oats Co., Chicago.



ALTHOUGH recommended approximately 20 years ago, use of non-inflammable gases for the reduction of fire hazards during grinding operations has become a satisfactory industrial practice only within the past year or so.

Engineering problems of both mechanical and chemical nature have been the hindering factors. And not until Quaker Oats Co. had occasion to move a portion of the gas treating and handling installation for its plant at Cedar Rapids, Iowa, a few months ago, was there convincing evidence that corrosion, the most persistent problem of all, had been overcome.

Addition of a heat interchanger to obtain a rise of approximately 35 deg. F. in the temperature of the gas between the scrubber and the blower played an important part in the solution of the corrosion problem. This prevented condensation of acid vapors. Another contributing factor was the use of cold, deep-well water instead of warmer river water in the scrubber to lower the SO_2 content of the gas. As a result, the metal surfaces of the fan and its housing, as well as the walls of the gas line, are kept dry and free from the acid-reacting film which had previously been so troublesome and had required frequent replacement.

Corrosion is, however, only one of the difficulties which had to be overcome. First of all, the causes of the explosions had to be traced to their origin and a method by which they might be controlled or prevented had to be found. Another problem has been that of obtaining a dependable source of noninflammable gas and the knowledge of how to handle it to make its use most effective.

While cost is a factor, it has not been seriously considered; principally because property and product damages from dust explosions have been as great as $2,000,000 and with a loss of life in individual plants destroyed by dust explosions. Also, insurance rates have been high and, in some cases, insurance companies refused to underwrite the risks.

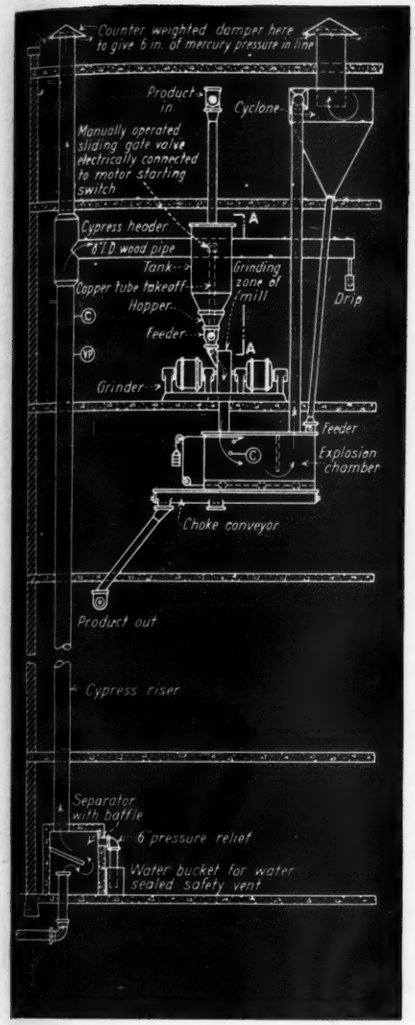
Quaker Oats Co. is only one of several companies which have experienced severe dust explosions. But some of the explosions in its plants have been so destructive and its insurance rates have been so high that in 1921 the company began to take steps to prevent them.

While investigations to determine the cause of the explosions were difficult to carry out, opinions were held that either the explosions originated in the grinders themselves or a fire was started in the grinders and propelled to a point where conditions permitted ignition of the explosive mixture of dust and air. These conclusions seemed reasonable because the grinders operate at a high rate of speed upon dry cereal grains with the formation of much highly inflammable dust. Heat of friction or a spark caused by the grinding plates striking a flinty pebble would be sufficient to ignite the dust in the presence of atmospheric oxygen.

In line with these opinions the possibility of doing the grinding under special atmospheric conditions which would not support combustion was considered. That thinking was encouraged by the experimental results obtained by D. J. Price and associates of The Bureau of Agricultural Chemistry and Engineering, U.S. Department of Agriculture, in their work with inert gases as a solution of the grinder explosion problem.[1] Their data showed that if the grinding were done in an atmosphere containing less than 15 percent oxygen, combustion could not

* On June 1, 1940, Mr. Kirn retired from active business and has been succeeded by Mr. M. Avedoveck as chief engineer.

[1] The Value of Inert Gas as a Preventive of Dust Explosions in Grinding Equipment, Department of Agriculture Technical Bulletin No. 74. See FOOD INDUSTRIES, October, 1928, page 21.



Flue gas for diluting oxygen content of dust-laden air in cereal grinders to a noninflammable, nonexplosive level is drawn from the stack of a vertical high-pressure boiler, scrubbed for removal of fly ash and acid vapors, and reheated to prevent corrosive condensation in fan and gas line.

take place; neither at the point of grinding nor at other points to which the fire had formerly been carried in the mill stream.

These results suggested replacing the air in the grinders with an inert gas. But the perplexing questions were how and what gas should be used. Existing experimental installations were relatively crude and not at all satisfactory for commercial adaptation.

FROM the standpoint of availability and continuity of supply, boiler flue gas was first considered and Quaker Oats Co. chose its Cedar Rapids plant as having the best facilities for the working out of a test set-up. That plant is only about 1,200 ft. distant from a generating plant of the Iowa Light and Power Co., from which the company buys its electricity and steam. The stack gas from that plant has a CO_2 content of 12 to 14 percent. It also contains SO_2 and water vapor; both of which have been sources of trouble from the beginning of the test set-up. The resulting sulphurous acid, very probably oxidized in part to sulphuric acid, readily acted upon the metal and concrete surfaces with which it came in contact.

During the intervening years much experimenting and revamping of the gas treating and handling facilities were tried before a satisfactory atmosphere of washed flue gas was obtained for the grinders. As the system now exists, the raw flue gas is taken from a vertical boiler, operating under 600-lb. pressure and burning pulverized coal, through a butterfly (damper type) valve connection into the stack just above the dust collector and preheater. Previously it had been taken from the stacks of the horizontal low-pressure boilers burning lump coal. But that gas ran excessively high in moisture and ash content because the connections had to be made at the top of the boiler breeching.

From the stack, the gas is pulled at the rate of 2,500 cu. ft. per minute, through a main 20 in. in diameter made of No. 10 gage, black rolled steel with welded joints. This main is insulated where exposed above the ground surface with a 1½-in. layer of rock wool and rubberoid paper of high quality roofing grade.

As the gas flows through this main into the bottom of the heat interchanger it has a temperature of approximately 400 deg. F.

In construction, the interchanger consists of three compartments. Two of the compartments consist of the space between the $\frac{3}{16}$-in. steel outer shell and the third compartment, a steel inner tube running from the top of the 50-ft. cylindrical tower to within about 10 ft. of its 4-ft. square base which is fitted with a clean-out door. This inner tube is in fact a section of the line leading the gas from the scrubber to the blower fan. The two outer compartments through which the hot raw gas flows are of equal size and are separated from each other by a baffle wall extending from the bottom of the tower to within about 4 ft. of the top through the diameter plane. The object of the baffle is to direct the flow of the raw gas from the bottom of one of the compartments to an outlet connection at the bottom of the scrubber.

During its upward and downward passage through the interchanger the raw gas loses an appreciable amount of its heat before entering the scrubber where the major part of its dirt and SO_2 content is washed out.

As now constructed, the scrubber is a cylindrical tower 5 ft. in diameter and 50 ft. high. It is made of ¼-in. black steel shell covered externally with aluminum paint and lined with a layer of high grade asphalt tar, a layer of No. 1 Douglas fir, and a second layer of the asphalt tar. The Douglas fir is in the form of 2x4-in. timbers extending lengthwise like staves from the bottom to the top of the tower. The bottom of the tower has a slope of 1¼ in. per radial foot to a center sewer drain. The bottom surface is covered with an acidproof cement which has proven much more satisfactory than other surface coverings used. They were previously pitted by the continuous impact of falling water until they finally disintegrated.

INSIDE the lined tower is a multiple-layer grid structure which begins about 6 ft. from the bottom of tower and extends to within about 6 ft. of its top. These grid layers consist of 2x4-in. No. 2 Douglas fir timbers cross laid to break up the downward flow of water and the upward flow of gas for the removal of ash and carbon particles as well as for the absorption of the SO_2 from the gas. The quantity of SO_2 absorbed by the wash water varies widely with the temperature of the water used. Until the past few months, river water with a temperature range of from 42 to 99 deg. F., depending upon weather conditions, was used. Since the temperature rise of the wash water ranges from 8 to 26 deg. F. during the passage through the scrubber, the SO_2 content of the washed gas also varies widely. It is highest when the temperature of the wash water is highest. Hence cold water is desired. The temperature change in the wash water is also affected by the temperature of the incoming gas (200 to 500 deg. F.) and the rate of flow of water through the scrubber (80 to 150 gal. per minute). Under this range of operating conditions, the SO_2 content of the incoming

This Article on
SAFETY

Is important to producers of

Flour, Cereal Products, Cocoa Products, Soybean Products, Sugar, Other Dry Powdered Foods

Because it gives detailed information about a successful method developed by Quaker Oats Co. for preventing dust explosions and fires formerly incident to their cereal grinding operations.—The Editors.

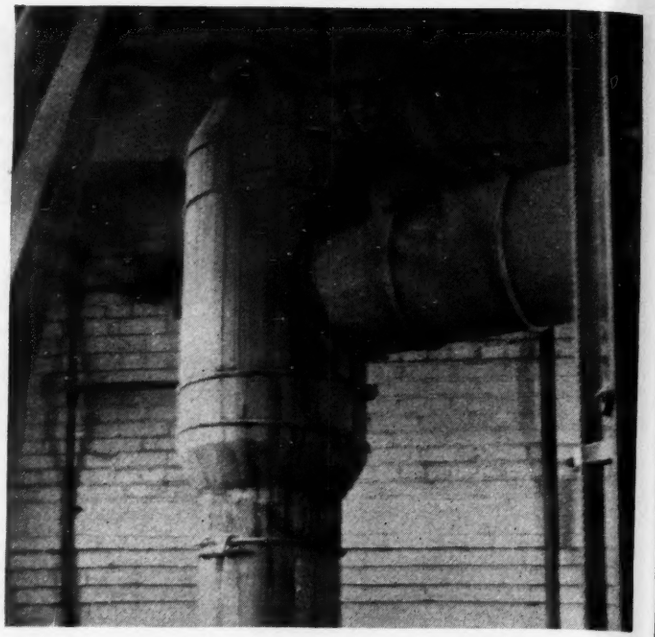
gas varied from 115 to 135 mg. of SO_2 per cubic foot of gas depending upon the sulphur content of the coal burned and upon the boiler operating conditions. The outgoing or washed gas had a SO_2 content ranging from 0 to 60 mg. per cubic foot, depending upon the temperature of the scrubber water and its rate of flow.

While no detailed studies have been made since cold, deep-well water has been used, the operating conditions in the system have improved greatly with convincing indications that the SO_2 content of the washed gas has been greatly reduced and that the content is held at a relatively uniform level regardless of atmospheric conditions.

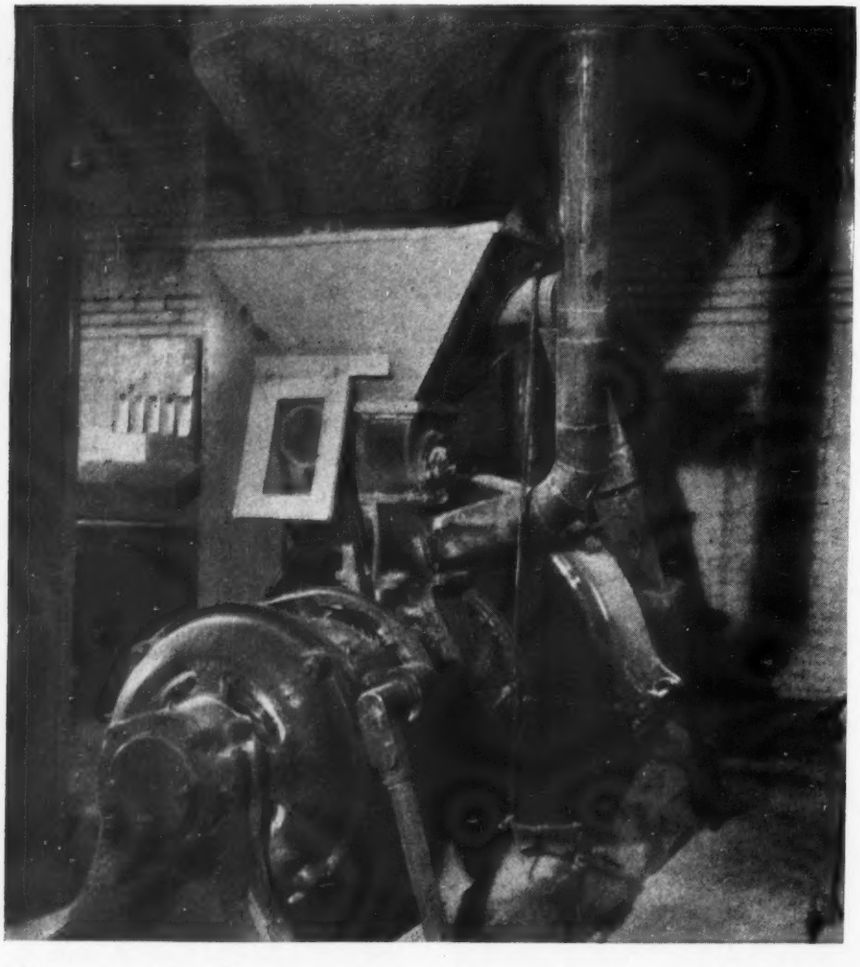
The sewer line leading from the bottom of the scrubber is of glazed tile, 10 in. in diameter, and includes a trap. This trap or sump has a 2-ft. water leg to make certain that no air is pulled through the sewer line by the blower placed between the heat interchanger and the grinding mills.

Although the gas has been freed of the greater portion of its dirt and SO_2 content in the scrubber, there is enough remaining to cause destructive corrosion when the gas passed directly from the scrubber to the blower. Under those circumstances the gas was practically, if not actually, saturated with water vapor at a temperature of approximately 90 deg. F. This water vapor condensed in the blower and the gas line, where it trapped enough dirt and SO_2 to form a highly corrosive film.

Under present conditions, the gas is drawn from the scrubber the scrubber through the heat interchanger where its temperature is raised to approximately 125 deg. F. as it passes through the outlet to the blower. This temperature is high enough to avoid condensation.



By means of an 8-in. inside diameter cypress header the gas is diverted from the cypress riser having a 12-in. inside diameter onto the grinding floor of the cereal plant. A counter-weighted, damper-type valve at top end of riser aids in keeping a constant gas pressure of not more than 6 in. of mercury on the gas feed line to the grinders.



Each copper tube delivers the gas directly into the throat of a grinder below the feed regulator to assure distribution of the gas through the cereal before the grinding surfaces of the mill are reached.

The blower has a 10.7-cu. ft. air discharge capacity per revolution of the fan and is driven by a 50-hp. squirrel-cage induction motor at a speed to deliver 2,500 cu. ft. of gas per minute. In that way, the flow of gas to the grinders is kept constant and the time of passage of the washed gas through the interchanger is regulated to assure the desired rise in its temperature.

From the blower, the gas is driven directly into a line of 12-in. diameter class D (lead-jointed) bell and spigot cast iron pipe. Provision is made for hooking up another blower, if and when wanted, as a standby unit or to increase the gas supply through another pipe line from the boiler.

Shortly after the gas is forced into the pipe lines it passes through a concrete dust trap or separating chamber, 2 ft. deep, and having a vertical baffle and a manhole clean-out opening for the removal of the dust accumulation at periodic intervals of time. Although only one of these dust traps with vertical baffle is shown in the accompanying sketch, there are three in the first 600 ft. of the pipe line between the blower and the grinders. By means of these three traps in the first half of the pipe line, the major portion of the suspended ash and carbon particles are removed from the gas before it has cooled sufficiently for its water vapor

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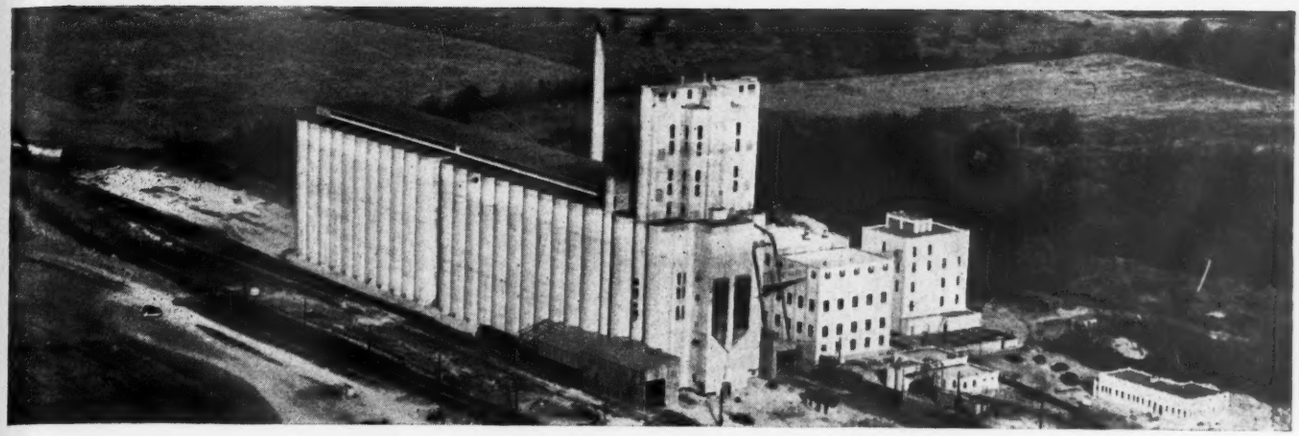

This soybean products plant of Archer-Daniels-Midlands Co. was recently erected at Decatur, Ill.

What's Happening With SOYBEANS?

Greatly increased production, with accompanying increase in soybean oil output and wider utilization of other soybean products, is influencing all food industries

By GORDON W. McBRIDE
Chemical Engineer, Washington, D. C.

SOYBEAN OUTPUT has increased nearly tenfold in the past decade, and has reached such proportions that of the vegetable oils only cottonseed oil exceeded soybean oil production in 1939. Moreover, soybeans are raised primarily for the oil content, whereas cottonseed oil is a byproduct of the cotton industry. Further, and most important, soybeans are on their own; they are not being subsidized (except by tariff) in any agricultural program. The attainment of this large production is based on real demand and the economics of soybean production are sound. With varieties of soybeans being adapted to all climates, including the southern strongholds of cotton, it is conceivable that the day may come when soybean oil production will lead that of all other domestic vegetable oils.

Acreage planted to soybeans in 1940 was 14 percent greater than in 1939. Many export markets for beans have been cut off this year because of the war. Hence the resulting domestic oil production this year may be relatively greater than the 14 percent increase in acreage implies. For the present, the plentiful supply of soybeans is contributing to continued low prices through the entire fats and oils structure, and suggests a very important future stability. This is desirable both for the industries that use the soybeans, and for the consuming public that will profit by that wider distribution, which low fat and oil prices will insure.

Although a considerable acreage of soybeans is devoted to growing seed and other farm uses, such as green manure, pasture, and feeds, this phase of the soybean story has only passing interest for the food man. However, in addition to the increasing quantities of soybeans that are brought to the market as a fresh green vegetable, larger quantities of the green beans are being canned each year. One unofficial estimate placed the 1939 pack at 15,000 cases (24 one-pound cans each).

Crushing of soybeans to obtain oil makes up by far the greatest tonnage of edible soybean activity. Continuous screw or expeller pressing accounted for three-quarters of the total 1939 yield of soybean oil. The solvent extraction method was responsible for only about one-fifth of the total, but this method is becoming increasingly popular. Batch hydraulic pressing accounted for the balance of the 458,000,000 lb. of oil produced.

Crude soybean oil, particularly when produced by solvent extraction, contains appreciable amounts of phosphatides. It is the practice of many mills to remove these by a water washing process before refining. The phosphatides are sometimes purified and sold as soybean lecithin, and sometimes returned to the soybean meal.

Refining of the crude oil for edible uses has been one of the major technical problems of the soybean industry. The traditional batch treatment with alkali was early tried and found wanting. The large kettles of the typical old type oil refinery have been superseded by small continuous proportioners, mixers, and centrifuges with relatively large capacity. The resulting treated oil is water-washed to remove any last traces of soap or alkali. It is then ready for bleaching, hydrogenating, deodorizing, winterizing, and other typical edible oil operations. The final product is a

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This article on

RAW MATERIALS

Is important to

All Food Manufacturers

Because it sets forth the rapid growth in soybean output, and shows how soybean products are increasing in variety as well as in quantity, thereby affecting all other food industries more and more, regardless of whether their products are fats, carbohydrates or proteins.

—The Editors.

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refined oil of good keeping quality, ready for any use to which it may be destined.

Initially, oil processors tried to adapt standard equipment and methods of oil seed crushing and oil handling to the soybean industry. However, cottonseed and linseed equipment required radical modifications and, in a number of cases, entirely new methods or machinery have been developed. These have not only proved advantageous for soybean processing, but also have been carried back to the older divisions of the oil seed business where they are making for superior results on cottonseed oil, linseed oil, and others. Perhaps this sort of development originating with soybean processing has done more during recent years to modernize the whole vegetable oil business than all other factors combined.

One recent improvement in preparation of food oils well illustrates the advantage of modern engineering practice. Typically, the deodorizing of vegetable oils is a batch process carried out slowly by direct steaming of the oil in large tanks, usually with the aid of vacuum. Much better results may now be obtained in continuous deodorizing equipment, patterned after a distillation column. The oil flows in at the top and works downward through the bubble-cap plates, being deodorized by the steam which passes upward. The entire column operates under very high vacuum.

When such a column has been stabilized in operation, it functions continuously and there results a uniform product with a minimum of control and at relatively low cost for the high refining capacity achieved. The advantage of short-time, low-temperature contact between oil and steam in producing a stable oil is very great, both as to quality of oil and economy of operation.

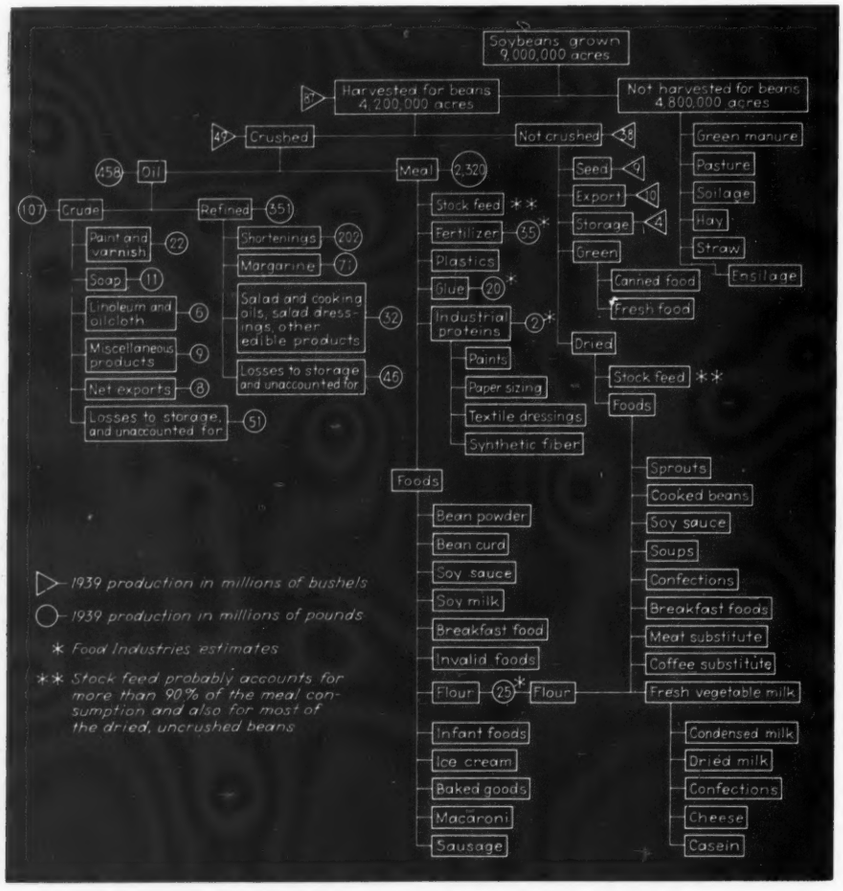
Many new uses of soybean oil are being developed. The 1939 statistics show the principal industries which account for soybean oil consumption. Of the 370,000,000 lb. total classified factory consumption, 305,000,000 lb. (or 83 percent) went into edible products. Two-thirds of this was used in manufactured shortenings, one-quarter in margarine, and the balance miscellaneously. Soybean oil has had its part in bringing about the development of new bleaching, deodorizing, chilling, and packaging methods and equipment in all the leading plants where shortenings are manufactured. The same is true of those plants where margarine and other edible oil products are manufactured.

Although soybean oil is used primarily as an edible oil, it is properly classified as a semi-drying oil. The reason for this is that soybean oil, even when refined, is not a single type of chemical compound. It is a mixture of drying and non-drying oils. This is true of a great many of the familiar fats and oils, of course. The differences between any two oils are determined mainly by the different proportions of the various constitutent compounds. It is to remove the drying properties (which are chemical) as well as to alter the physical properties that such an oil as soybean is "hardened" (hydrogenated) before making into a shortening or margarine.

The use in paints and varnishes accounted for only 6 percent of the 1939 factory consumption of soybean oil, but the percentage increase in this use over 1938 was nearly 45 percent. One hundred percent soybean oil varnishes have been made; and up to 20 percent soybean oil can be mixed with linseed oil without depreciating the quality of linseed oil paints.

The United States has never completely supplied its requirements of drying oils for the paint and varnish industry by domestic production. Linseed oil costs much more to produce in this country than in Argentina, and the Oriental tung and perilla oils are not produced in this country in significant quantities. A radical change in this dependence on foreign supplies is hoped for as a result of two processes developed recently for separating the drying (paint) and the non-drying (food) fractions of an oil.

These processes are, of course, significant not only for soybean oil, but also for fish oils and others which contain appreciable proportions of the drying oil fatty acids. The benefit may be considerable for the food oils as well, first, because the saturated



Products so far made from soybeans in commercial quantity are shown on this chart, with quantities of major products produced in 1939.

Table I—Salient Soybean Statistics

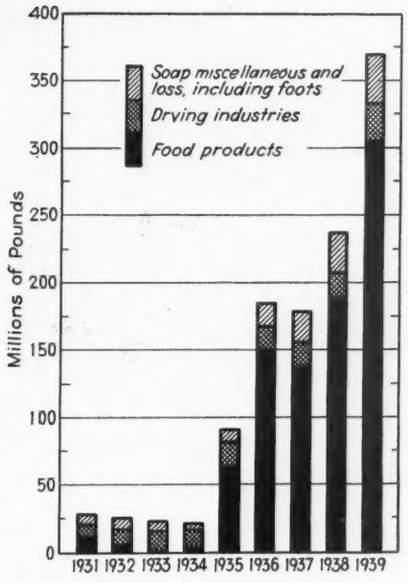
Calendar Year 1939 (Official Data)

Total acreage of soybeans	9.0 million acres
Harvested for beans	4.2 million acres
Total harvest of beans	87 million bushels
Average yield (harvested)	20.7 bushels per acre
Beans crushed	49 million bushels
(60 lb. bu.)	(2,947 million pounds)
Oil produced	458 million pounds
Oil yield	9.35 pounds per bushel
Meal produced	2,320 million pounds
Meal yield	47.3 pounds per bushel
Loss and moisture	3.35 pounds per bushel

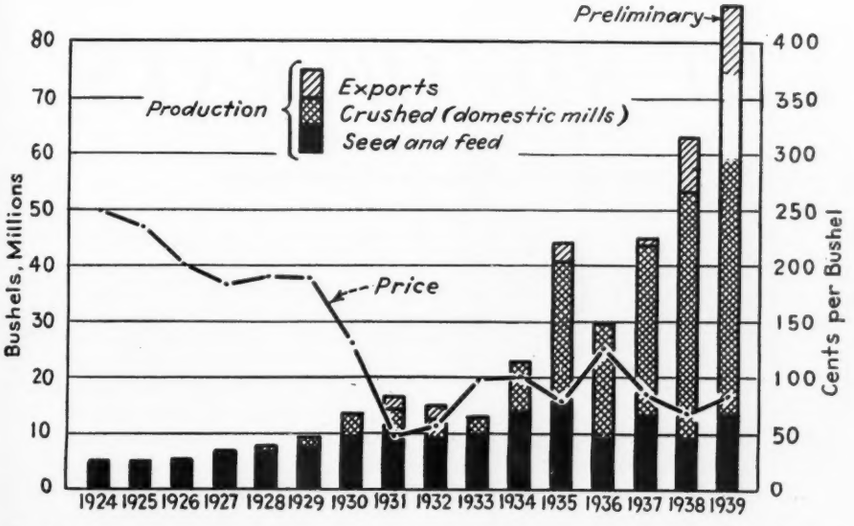
(non-drying) components will have greater value to the food manufacturer than the original oil had and, second, because large scale application may serve to divert large amounts of semi-drying oils into industrial channels, possibly reducing the perennial surplus of domestic edible oils.

In the soap industry very little increase in the use of soybean oil has occurred in the last three years, nor is it likely to increase as long as the oil is suitable for the higher value edible and drying uses. In the manufacture of miscellaneous products, the use of soybean oil and derived fatty acids has been increasing in recent years, as would be expected with the larger supplies available. This increase in miscellaneous uses will probably continue, as new uses and new technics are developed.

The soybean meal which is left after the oil is removed is fairly high in protein content (41 to 44 percent, compared with typical cottonseed meal content of 39 percent and linseed meal



What became of the soybean oil made in the U. S. in the years 1931–1939. Data from the U. S. Department of Agriculture, based on Bureau of Census data.



Production, utilization and average farm price of soybeans in the United States, 1924–1939. Each vertical bar represents the number of bushels of soybeans harvested in the year indicated. The subdivisions of each bar represent the utilization of that harvest. Thus, although the production is for the calendar year, the soybeans harvested in any one year are crushed, exported, or used for seed and feed until about October 1 of the next year. The 1939 utilization figures are estimated for the nine months October, 1939, to June, 1940, inclusive. Data are from the U. S. Department of Agriculture.

37 percent). It serves principally as a stock feed, though many food products are also made from meal—flour, macaroni, breads and other baked goods, infant and invalid foods and others. Dried whole soybeans are also processed at many food plants in the preparation of such soybean products as soups, breakfast foods, boiled and baked beans, soy sauce, coffee substitute and vegetable milk. Besides the fresh soy milk, condensed and dried milks are also manufactured.

Soybean flour is basic to many of these food products—and it may be made either of the whole bean or of the meal left after oil recovery. A typical flour made from whole beans has the following approximate composition:

	Percent
Protein	40
Carbohydrate (incl. 2 percent fiber)	25
Fat	20
Phosphatides	2.5
Ash	4.5
Moisture	8

Analysis of a flour made from solvent process meal would, of course, show very little fat and correspondingly greater proportions of protein, carbohydrate, phosphatides, and ash, e.g.:

	Percent
Protein	50
Carbohydrate (incl. 2 percent fiber)	32
Fat	1
Phosphatides	3
Ash	6
Moisture	8

Flours with fat content at almost any intermediate point could readily be prepared. Production of all kinds of soy flour amounted to about 25,000,000 lb. in 1939.

The keeping quality of the flour containing large amounts of fat is improved by steaming the beans before milling. This inactivates the enzymes which would otherwise hasten rancidity; it also removes by steam distillation those volatile components responsible for the objectionable "beany" flavor.

The large quantities of meal which have come onto the feed market in the past few years have significantly affected the sales of cottonseed meal and linseed meal. The fertilizer industry is also beginning to notice this new source of organic nitrogen, though the tonnage used has not become significant.

Industrial proteins are produced commercially from solvent extracted soybean meal and find application in the manufacture of paper sizings, adhesives, laminated fiberboard, water paints, and miscellaneous coatings. Small molded parts are also being produced from preparations containing phenolic or urea molding compositions in admixture with varying amounts of purified soybean protein pre-hardened with formaldehyde.

One large potential outlet for the meal is in the manufacture of a protein fiber by technics comparable with those already well known for other synthetic fibers. This soy fiber has some of the properties of silk and some of those of wool. It is already in use in Japan, and we may see a domestic product on the market in this country before long (Ford Motor Company, automobile upholstery). The high carboyhydrate content of the meal is overshadowed by the protein; but important carbohydrate derivatives may some day also contribute to the long list of soybean products.

In conclusion, emphasis should be placed on the need for balanced markets in such a multi-product business. As the number of acres planted to soybeans increases each year, the effect of the soybean research is being felt over a wider range. We may already feed, clothe and house ourselves with soybean products; and work with soybeans has just begun.

HOW TO GET RID OF RATS

Methods successfully used in English food factories and warehouses

By ERIC HARDY
Liverpool, England

I DOUBT very much if the highly impressive rat destroying methods requiring dangerous chemicals, expert biologists injecting bacteria or a disease virus, and so forth, are any more efficient than a close study of the rat's ways before one seizes upon the most ultramodern idea of killing it. Traps that are handled as little as possible, baits that are chosen to avoid offering something already abundant in the factory and varied from month to month to avoid monotony, and appreciation of the fact that one is pitting one's brains against the habits and the cunning of a wild animal—these are all important.

We have found that in the use of box traps a small mirror in which the rat can see its reflection will fascinate it and lure it inside when the bait fails. A little aniseed, beer or rum has an attractive, almost seductive, odor on the poorest bait. With other traps used during the time when rats are mating and therefore in heat, a deadly lure is obtained by killing and opening a female rat and rubbing her urine or ovaries on the trap.

The use of steel-tooth traps over a period of years has the effect of gradually increasing the rat population, for it kills a majority of males. The female rats are more retiring, seeking quieter haunts to give birth to their young. It is the more active, foraging males which are trapped. There is normally a majority of male rats in a factory or district, and these, worrying the females, do not permit maximum breeding. But when the balance is more evenly adjusted by unscientific, unwise trapping, the does are left to rear their young in peace. Moreover, having bred with rats that have learned to evade traps, they will tend to produce offspring inheriting trap-wisdom. This is avoided by adopting differing trapping methods.

Favorite foods of rats are fine oatmeal, or rolled oats, kipper or bloater, "dripping"* or cold meat fat, and finely granulated sugar. Where there is an abundance of grain stored in a building, or grain foods like biscuits or bread, then a fish bait is advised, and so on. Baits containing poisons like arsenic, strychnine and phosphorus are much more dangerous and not always so effective as those containing barium carbonate or red squill, either as bulb powder or liquid extract. Red squill is preferable to poisonous baits where there are stored food supplies likely to be contaminated, but inferior forms should be avoided. The druggist should guarantee the toxic quality of his red squill.

Three barium carbonate baits (which are dangerous to domestic animals) are prepared as follows: (1) Melt one part (a teaspoonful) of fat or dripping and mix into a paste with equal parts of barium carbonate powder, grated cheese or minced kipper, and fine oatmeal. (2) Melt one part of fat and mix with it an equal part of barium carbonate powder and two parts of rolled oats, using less fat in hot summer weather. (3) Mix one part each of barium carbonate powder and finely graulated sugar with two parts of fine oatmeal by rubbing through a sieve and mixing well. Add a trace of aniseed oil to each bait.

Three red squill baits are made as follows: (1) Add some liquid extract of red squill to an equal part of boiled

* "Dripping" is the liquid fat that has run off roast meat and allowed to cool and solidify.

and cooled milk and steep sufficient bread in it to form a thick paste. (2) Melt 1½ parts of fat and form a paste with 1 part of red squill powder and 2½ parts of fine oatmeal or rolled oats. (3) Mix well 1 part of red squill powder and 2 parts each of fine oatmeal and finely granulated sugar. Estimate the number of rats present in the building and lay ten times as many baits. Carefully record the place where each poisoned bait or trap is laid and visit regularly; dead rats lying about warn other rats against the bait or trap. Keep a rat book and record the number of successes and failures for each spot, and each type of bait. You will then learn the favorite haunts and runs, if you have not detected these by looking for rodent footprints on the dust of pipes, ledges and so forth.

If deadly baits like thallium sulphate, strychnine sulphate, arsenic and phosphorus are used, place the bait in a box which admits rats by one or two holes for safety's sake. But make the bait of such a nature that it cannot be carried away by the rats and stored elsewhere. The intense bitterness of strychnine sulphate is neutralized with equal parts of saccharine and orange juice. It dissolves in boiling water and the bait is then soaked in the solution overnight.

There is danger in using a rat virus to cultivate disease among the rats. At first this wipes out the weakly rats, and the results are very impressive. But some of the rats recover from the disease and build up a natural immunity to further infection, and a new colony of rats replaces the old ones and these are much more difficult to kill. Rats so treated may pass the disease to human workers or purchasers of the food by virus-contaminated droppings. An outbreak of enteritis among workers of a large company in London was attributed to the use of one of these rat viruses in the building. And according to Dr. Hans Wreschner, several cases of death and many cases of illness in human beings are on record as being caused by using bacteriological preparations to kill rats and mice.

Fumigation or gassing with various chemicals is also advised where ratholes are known and the retreats are inaccessible. Exhaust from automobiles, hydrocyanic acid gas, acetylene generated from calcium carbide with care, and other gases are used, but always precautions should be taken where food is stored. Gassing is useless unless all holes are found and plugged up, and if not in skilled hands it is less effective than traps or poison baits. Calcium cyanide dust is effective if blown into ratholes with a special dusting machine constructed for the purpose. But unless the rats have soil runs or some place where there is moisture to act on the powder and give out hydrocyanic acid gas, it has little effect. In buildings, its high toxicity warrants extreme caution and expert advice. Gassing, however, kills both large and small rats, male and female, strong and weak, and furthermore, it fumigates the burrows.

It is wise to extend your rat war away from your own factory. Discover all the local sources of supply—rubbish tips, ship wharfs, farms, banks or hedges where rats have their quarters and from which they make journeys to your building for food. Gassing at these sources may be far more effective than in your buildings.

At one time we kept mongooses in our English factories to catch rats. They do the job well enough, so long as the supply of rats lasts, but when they get rid of the majority of the rats, the mongooses wander off on their own and quickly run up a colossal bill for the slaughter of poultry, game and small farm stock miles away.

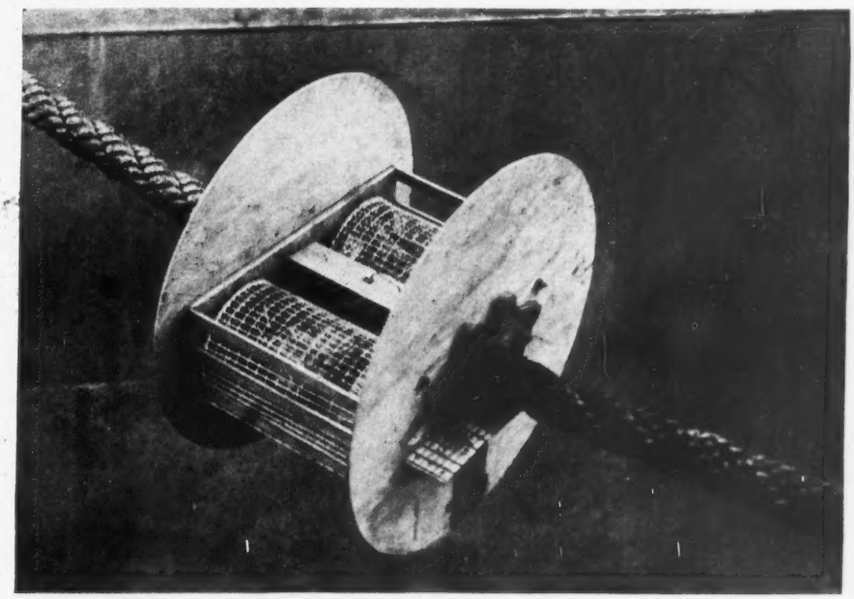
A general ratting campaign about the fall of the year in rural localities catches the rats on their return migration from the farm fields where many spend the summer feeding on roots and grain. Encourage local farmers and sportsmen to protect owls and other natural foes of rats.

Buildings can be rendered rat-proof by means of concrete foundations, brick work laid on cement, and galvanized iron sheeting, with floors of the building made of, or laid directly on, concrete. Proper repair of drain pipes, ventilators, doors and basement windows is necessary, for rats gain access frequently by swarming up pipes. Basement windows should also have ½-in. mesh galvanized wire netting; basement doors should have the lower part covered with thin metal sheeting so that rats cannot gnaw through. Any ratholes or burrows found should be filled with concrete, a mixture of cement, sand and broken glass or crockery, or broken glass and tar.

The existence of rats depends upon the food they can obtain—reduce this to a minimum and less trapping and baiting will be required. Hungry rats will take bait quicker.

Iron sulphate or green vitriol is a cheap deterrent whose use will keep rats away from a building. Dissolve 1 cwt. of crystals in 40 gal. of hot water and add a teaspoonful of crude carbolic acid. Then spray this preparation on refuse heaps, pipes and other means of access, and squirt it through holes in the floors. This will also destroy the maggots of house flies. Or powdered iron sulphate may be dusted, but it is a powerful poison where foodstuffs are concerned.

Chloride of zinc with perfume or pinewood oil is used to deodorize places of the smell of rats, especially if one has died in a hole. A cloth soaked in this may be hung up in the room.



If ships dock near your plant or warehouse, here's a trap that prevents rats from leaving or boarding the boat by way of the mooring ropes. The trap is fixed to the rope. Rodents ascending the rope enter one side; those descending, the other.

FLOUR MILLING
Received wheat
Receiving separator
Dust collecting
Milling bin
Material handling
Magnetic separator
Automatic weighing
Milling separator
Seed separator
Cleaning (Scourer)
Dampening
Material handling
Conditioning (Tempering)
Material handling
CLEANING DEPARTMENT
Sifting
Purifier (Scratch or bran purifier)
Dust collecting
Grinding (Roller mill)
Feed governor
Grinding screenings
(Hammer mill)
(Scourer)
Packaging feed
Purifier
Grinding (Roller mill)
Duster
(Scouring flour from bran)
Grinding (Roller mill)
Bolting Reel
Grinding
Bolting Reel
Bleaching
Rebolt Reel
Grinding (Roller mill)
Packaging flour
Dust collecting
Grinding
Suction fan
FLOUR PROCESSING DEPARTMENT

Digest of A.M.S. Standards For Canned Fruits

QUITE a number of U.S. standards for grades of canned fruits and vegetables have been issued recently by the Agricultural Marketing Service, both tentative and final. In order to present this material more completely than is possible by simple notice of the issuance of these standards abstracts have been prepared. The following group of abstracts includes canned apples, canned peaches, canned pears and canned plums.

Other standards which have been issued to date include canned blackberries, red raspberries, red sour pitted cherries, sweet cherries, asparagus, beets and carrots. Abstracts of these standards will be presented in future issues of FOOD INDUSTRIES.

It should be understood that these abstracts are for the use of those interested in the subject of food standards in general rather than for those companies which are specifically processing these commodities. Any company which is actually canning apples, or peaches, or any of the other fruits or vegetables will, of course, have to refer to the complete text of these standards. Copies may be obtained by writing to the Agricultural Marketing Service, U.S. Department of Agriculture, Washington, D.C. Each standard includes a sample score sheet.

CANNED APPLES

(Tentative)

Canned apples are the canned fruit prepared from sound, properly ripened fresh fruit by proper peeling, coring, trimming, and washing; packed with or without sugar sirup, in hermetically sealed containers, and sufficiently processed by heat to assure preservation.

U.S. GRADE A or U.S. FANCY canned apples are apples sliced into segments not larger than quarters; possess similar varietal characteristics; are of uniformly good bright color; are not less than 2 in. in length after processing, and are reasonably uniform in size. They are practically free from defects; possess a firm but tender texture and a normal apple flavor; and score not less than 85 points when scored according to the scoring system.

U.S. GRADE C or U.S. STANDARD canned apples are apples sliced into segments; possess similar varietal characteristics; and may vary noticeably in color and size. They are fairly free from defects; may possess a variable texture, a normal apple flavor; and score not less than 70 points when scored according to the scoring system.

OFF-GRADE (Substandard) canned apples are apples which score less than 70 points, or, when any one of the grading factors except UNIFORMITY OF SIZE falls in the lowest subdivision.

"Normal flavor" means that the product is free from objectionable or off flavors of all kinds.

The grade of canned apples may be ascertained by considering, in addition to the foregoing requirements, the following factors: color (25 points), uniformity of size (15 points), absence of defects (25 points) and character of fruit (35 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

I.—Under the factor of color, the typical color for the variety and its uniformity are considered.

II.—Under the factor of uniformity of size, consideration is given to the uniformity of cut and size of segments. To receive a rating within the highest group, 12 to 15 points, the segments throughout the can should be reasonably uniform in size. "Reasonably uniform in size" means that the segments are not less than 2 in. in length and that the longest segment in the can shall not exceed in length the shortest whole segment in the can by more than ½ in., and that the widest segment shall not exceed in width the narrowest segment by more than ¼-in., when measured at the point of greatest width on the circumference.

III.—Under the factor of absence of defects, consideration is given to the care exercised in peeling, coring and trimming; to the presence of carpel tissue, peel sepals, pathological or insect injury of any kind, or other defects. Bruises exceeding ½ in. in diameter in the aggregate on one segment or ⅛-in. in depth shall be considered as defects.

IV.—The factor of character of fruit refers to the tendency of the segments to retain their normal shape and size, or to disintegrate or break down and become mushy due to overripeness, improper handling, or processing. Hardness due to immaturity, or other conditions brought about through processing, mechanical or other means, are also considered under this factor.

ISSUED, June 7, 1940.

EFFECTIVE, July 1, 1940.

CANNED FREESTONE PEACHES

(Tentative)

The standards of identity, fill of container, and quality for canned peaches promulgated by the Secretary of Agriculture under Sec. 401 of the Food, Drug and Cosmetic Act of June 25, 1938, are hereby adopted for the purpose of these grades.

U.S. GRADE A or U.S. FANCY canned freestone peaches are well ripened peaches of similar varietal characteristics; are practically uniform in color, size and symmetry; are practically free from defects; are intact, and possess a reasonably firm but tender, fleshy texture, a normal peach flavor; and score not less than 90 points.

U.S. GRADE B or U.S. CHOICE canned freestone peaches are well-ripened peaches of similar varietal characteristics; are reasonably uniform in color, size and symmetry; are reasonably free from defects; are reasonably intact; and possess a fairly firm and reasonably tender texture; a normal peach flavor; and score not less than 75 points.

U.S. GRADE C or U.S. STANDARD canned freestone peaches are peaches of similar varietal characteristics; are fairly uniform in color, size and symmetry; are fairly free from defects; may possess a variable texture but none of the units are objectionably hard nor markedly mushy; possess a normal peach flavor; and score not less than 60 points.

U.S. GRADE D (Seconds) canned freestone peaches are peaches which fail to meet the requirements of U.S. GRADE C in some respect, or which fall into the lowest subdivision with respect to any one of the grading factors, and which possess a normal peach flavor and are not off-color. Peaches of this grade are normally packed in light sirup.

U.S. GRADE E (Water or Pie-Pack) canned freestone peaches are of the same character as U.S. GRADE D (Seconds) except packed in water.

U.S. GRADE F (Solid Pack-Pie) canned freestone peaches are peaches packed without added sirup or water in such manner that the drained weight is 92 oz. or over in No. 10 cans.

OFF-GRADE canned freestone peaches are peaches which fail to meet the requirements of the foregoing grades.

Canned peaches that fall below the Standard of Quality promulgated under the Food, Drug and Cosmetic Act will be certified with the additional statement "Below Standard in Quality" together with the reason for so certifying.

Grades A, B, C, D of canned freestone peaches are usually packed in sugar sirup. *At time of packing,* sirup of 55 deg. Brix density is commonly used on U.S. GRADE A canned peaches; 40 deg. Brix on U.S. GRADE B canned peaches; 25 deg. Brix on U.S. GRADE C canned peaches; and 10 deg. Brix on U.S. GRADE D. Sirup "cut-out" requirements, however, are not incorporated in the grades of the finished product as sirup as such is not a factor of grade for the purpose of these grades.

Canned peaches will be certified as to grade without regard to sirup density, but in each instance official certificates of grade will bear a notation in connection

with the grade statement indicating the density of sirup *found upon examination.* For this purpose "Extra heavy sirup" means that the sirup tests 24 deg. Brix or over. "Heavy sirup" means that the sirup tests 19 deg. to 24 deg. Brix. "Medium sirup" means that the sirup tests 15 deg. to 19 deg. Brix. "Light sirup" means that the sirup tests 12 deg. to 15 deg. Brix. "Water Pack" means that the packing media tests less than 12 deg. Brix.

"Normal flavor" means that the product is free from objectionable or off-flavors of all kinds.

The maximum head space and the minimum drained weights allowable in the cans commonly used in packing canned peaches are tabulated in the standards. Cans of freestone peaches, meeting the drained weight requirements, that have not been packed as full as possible without impairment of quality will be certified "Below Standard in Fill". In addition, if the average of cans in a sample meets these requirements, the sample will be certified without exception.

The minimum and maximum number of halves of peaches per can, and the maximum variation in the number of pieces per can are also tabulated in the standards.

The grade of canned peaches may be ascertained by considering, in addition to the foregoing requirements, the following factors: color (25 points), uniformity of size and symmetry (20 points), absence of defects (20 points) and character of fruit (35 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

ISSUED, May 28, 1940.
EFFECTIVE, July 1, 1940.

CANNED PEARS

(Final)

The standards of identity, fill of container, and quality for canned pears promulgated by the Secretary of Agriculture under Sec. 401 of the Food, Drug and Cosmetic Act of June 25, 1938, are hereby adopted for the purpose of these grades.

U.S. GRADE A or U.S. FANCY canned pears are units (halves, quarters, sliced or whole) of well-ripened pears of similar varietal characteristics; are practically uniform in color, size and symmetry; are practically free from defects; possess a firm but tender fleshy texture; a normal pear flavor; and score not less than 90 points.

U.S. GRADE B or U.S. CHOICE canned pears are units of well ripened pears of similar varietal characteristics; are reasonably uniform in color, size and symmetry; are reasonably free from defects; possess a firm and reasonably tender texture; a normal pear flavor; and score not less than 75 points.

U.S. GRADE C or U.S. STANDARD canned pears are units of pears of similar varietal characteristics which may be variable in color, size and symmetry; are fairly free from defects; the texture may be variable. but none of the pieces are objectionably hard or, contrariwise, mushy; possess a normal pear flavor; and score not less than 60 points.

U.S. GRADE D (Seconds) canned pears are pears which fail to meet the requirements of U.S. GRADE C in some respect and which possess a normal pear flavor and are not off color. Pears of this grade are normally packed in light sirup.

U.S. GRADE E (Water) canned pears are of the same character as U.S. GRADE D (Seconds) except packed in water.

U.S. GRADE F (Solid Pack Pie) canned pears are pears of the same character as U.S. GRADE E except packed without water or sirup in such manner that the drained weight is 92 oz. or more in No. 10 cans.

OFF-GRADE canned pears are pears which fail to meet the requirements of the foregoing grades.

Canned pears that fall below the Standard of Quality promulgated under the Food, Drug and Cosmetic Act will be certified with the additional statement "Below Standard in Quality," together with the reason for so certifying.

Grades A, B, C, D of canned pears are usually packed in sugar sirup. *At time of packing,* sirup of 40 deg. Brix density is used on U.S. GRADE A canned pears; 30 deg. Brix on U.S. GRADE B canned pears; 20 deg. on U.S. GRADE C canned pears; and 10 deg. Brix on U.S. GRADE D.

Canned pears will be certified as to grade without regard to sirup density, but in each instance official certificates of grade will bear a notation in connection with the grade statement indicating the density of sirup *found upon examination.* For this purpose: "Extra heavy sirup" means that the sirup tests 22 deg. or over Brix. "Heavy sirup" means that the sirup tests 18 deg. to 22 deg. Brix. "Medium sirup" means that the sirup tests 14 deg. to 18 deg. Brix. "Light sirup" means that the sirup tests 10 deg. to 14 deg. Brix. "Water Pack" means that the packing media tests less than 10 deg. Brix.

The grade of canned pears may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (20 points), uniformity of size and symmetry (15 points), absence of defects (30 points) and character of fruit (35 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

ISSUED, May 3, 1940.
EFFECTIVE, May 15, 1940.

CANNED PLUMS

(Tentative)

Canned plums are the canned fruit prepared from the properly ripened and properly prepared fresh fruit. The fruit may be packed with or without peeling; with or without sugar sirup; with or without pits; and is sufficiently processed by heat to assure preservation of the product in hermetically sealed containers.

The following varieties of canned plums are recognized: Italian prunes, green gage plums and yellow egg plums.

U.S. GRADE A or U.S. FANCY canned plums are whole or halved, well-ripened plums of similar varietal characteristics; are of uniformly high color for the variety; are practically uniform in size and symmetry; are practically free from defects; possess a firm, but tender, fleshy texture; a normal plum flavor; and score not less than 90 points.

U.S. GRADE B or U.S. CHOICE canned plums are whole or halved, well-ripened plums of similar varietal characteristics. They are of good color for the variety; are reasonably uniform in size and symmetry; are reasonably free from defects; possess a firm and reasonably tender texture; a normal plum flavor; and score not less than 75 points.

U.S. GRADE C or U.S. STANDARD canned plums are whole or halved plums of similar varietal characteristics; are of fairly good color for the variety; are fairly uniform in size and symmetry; are fairly free from defects; possess a fairly good texture; a normal plum flavor; and score not less than 60 points.

U.S. GRADE D (Seconds) canned plums are plums of similar varietal characteristics; may be pale or noticeably variable in color and size, but are not off color; are fairly free from pathological defects and may possess prominent mechanical defects; may possess a noticeably variable texture; and possess a normal plum flavor. Plums shall be classified as U.S. GRADE D (Seconds) when any one of the grading factors, except UNIFORMITY OF SIZE, falls in the lowest subdivision. Plums of this grade are normally packed in light sirup.

U.S. GRADE E (Water or Pie Pack) canned plums are of the same character as U.S. GRADE D (Seconds) except packed in water.

OFF-GRADE (Substandard) canned plums are plums which fail to meet the requirements of the foregoing grades.

Grades A, B, C, D of canned plums are usually packed in sugar sirup. Sirup "cut-out" requirements, however, are not incorporated in grades of the finished product as sirup, as such, is not a factor of grade for the purpose of these grades.

Canned plums, therefore, will be certified as to grade without regard to sirup density, but in each instance certificates of grade will bear a notation in connection with the grade statement indicating the density of sirup *found upon examination.* For this purpose: "Extra heavy sirup" means that the sirup tests 26 deg. or over Brix. "Heavy sirup" means that the sirup tests 21 deg. to 26 deg. Brix. "Medium sirup" means that the sirup tests 16 deg. to 21 deg. Brix. "Light sirup" means that the sirup tests 12 deg. to 16 deg. Brix. "Water Pack" means that the packing media tests less than 12 deg. Brix.

"Whole" means that the fruit retains its normal conformation and is not crushed. Cracking of the skin is peculiar to the product, and the fruit is considered whole even though cracked, if the skin adheres to the fruit and the pit is not exposed.

A table in the standards suggests the maximum counts for Grade A plums of the various types. However, if all requirements for Grade A are met except the suggested provisions for count, the grade will be certified, and official certificates of grade will indicate the range of count.

The grade of canned plums may be ascertained by considering, in addition to the foregoing requirements, the following factors: color (25 points), uniformity of size and symmetry (20 points), absence of defects (20 points) and character of fruit (35 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

ISSUED, June 7, 1940.
EFFECTIVE, July 1, 1940.

New Packages & Products

Waxless Containers For Cottage Cheese

An improved type of container suitable for cottage cheese and other moist food products has recently been introduced. This new container offers several advantages for packaging this type of food.

Neither the container liner nor the outer surface requires wax which might be scraped into the food while removing the contents. The new type lining nevertheless provides ample protection for the contents. The container is closed with a slip-cover which fits very tightly over slight circular scorings around the cylindrical container top.

Michigan Cottage Cheese Co., Otsego, Mich., Village Farm Dairy, Bonduel, Wis., Lakefield Creamery, Crafton, Wis., Sheboygan Falls Creamery, Sheboygan Falls, Wis., and Huebner Dairy, Cudahy, Wis., are packaging cottage cheese in this improved type of waxless paper food container.

Cola Concentrate for Home Use

For over a generation the popular American drink has been the non-alcoholic carbonated beverage made from an extract of the cola nut. Whether mixed at the soda fountain or bought carbonated in the bottle, it has been the drink most often consumed by the largest number of Americans. Throughout more than 30 years, America has bought its cola drinks as a beverage, ready mixed and carbonated. Now "Mixa Cola," product of Homix Products Co., New York, bids for a share of this popular drink's market. "Mixa Cola" is a concentrate to be made into a beverage at home by the addition of club soda or charged water, or into a milk-cola drink with the addition of milk. It is also suggested for use in alcoholic drinks.

Gift Packages Give LIFT to Sales

Many residents of metropolitan New York and Long Island who never would have thought of giving or receiving a ham as a Christmas present were both surprised and delighted last year with the decorated luggage-type folding carton containing a handsomely packaged ready-to-eat smoked ham.

Some foods can be sold only in gift packages. Others reap new business when packaged as a present

By IVAN C. MILLER
Distribution Editor, FOOD INDUSTRIES

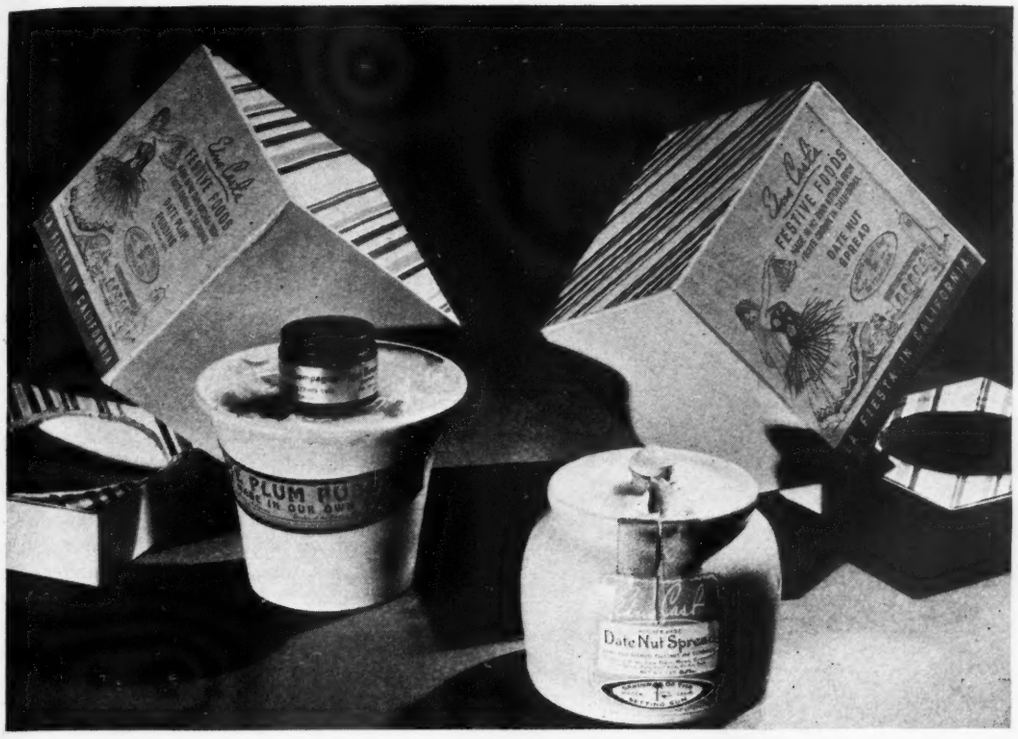
WITH the introduction of new packaging materials which "glorify the product" the general appearance of food packages has improved. During holiday seasons many packages take on additional festive outer wraps which clothe them with new appeal. Competition usually suffers as consumer choice in day-to-day purchases is influenced in favor of the attractive, more appealing packages. The sales curves of foods in appealing packages prove the wisdom of such packaging.

There is, however, packaging which goes beyond influencing a choice between competing foods or brands. There is packaging which urges "purchase-for-gifting." Confectionery manufacturers have had wide experience with this type of packaging.

From the 1939 Department of Commerce report on the confectionery industry it is difficult to determine with accuracy the ultimate sales of candy in bulk and packaged form. A portion of manufacturers' bulk sales no doubt reaches the consumer as packaged merchandise assembled by distributors. Nevertheless, it is safe to state that the two billion pounds of confections consumed in 1939 would have been disastrously less were it not for the sale of candy assortments in special packages.

Candy packaged to induce purchase-for-gifting is profitable, though it is an accepted trade commonplace. Packaging of most of the less glamorous foods to induce purchase-for-gifting is either still in the trial and experimental stage or is untried. The results on record, however, of those foods packaged to induce purchase-for-gift-

This gift package, shipped direct over a radius of 1,000 miles, sold 25,000 cartons of celery during December, 1939. Many who received the gift celery asked local dealers to stock the brand.

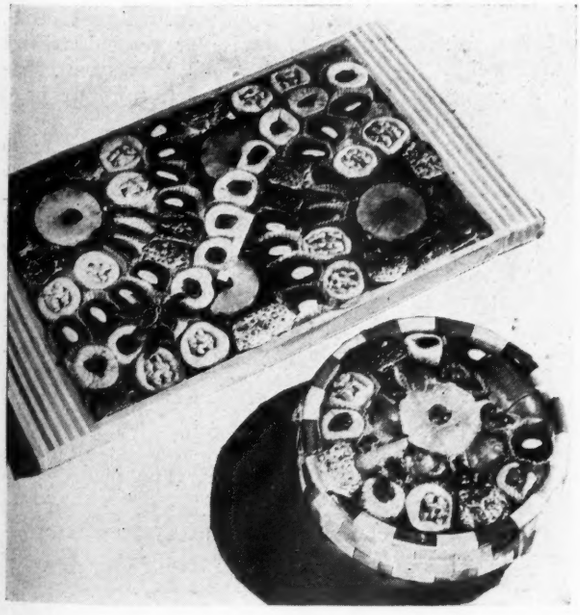


These two packages, products of Garden of the Setting Sun, Mecca, Calif., are designed to lead to purchase-for-gifting. The date plum pudding, made of dates, candied oranges, lemon, citron, cherries, nuts and eggs, all drenched with brandy, was first packaged as an ordinary grocery store product in a tin can. The required price was not in line with that of other canned puddings. Sales resistance was too great for profitable sales. All the company's puddings were then packaged in small crockery bean pots. Sales skyrocketed. The present container with the large mouth was then adopted to facilitate removal of the contents. This product and other foods produced by Garden of the Setting Sun find a ready market packaged as gifts. They met sales resistance when not so packaged.

ing indicate rare opportunities for a wide range of food producers.

Last year H. C. Bohack Co., Long Island corporate chain, introduced a baked ready-to-eat smoked ham, which, though it appeared like other hams, necessarily required a premium selling price because of processing costs. The product encountered immediate sales resistance in the retail outlets from the sales people who sensed definite consumer resistance. The ham was then dressed up in a transparent cellulose wrapper, gayly printed in vivid color on a gold background. For the approaching holiday season a single handsomely packaged ham was fitted into a festively decorated holiday folding carton which when closed formed a luggage-type carry-away gift package. Clerk resistance melted, and with it consumer resistance. Clerk enthusiasm resulted in displays, spirited selling and sales. As a result, many a gift packaged Bohack ham was under the Christmas tree in Long Island homes on Christmas morning.

The sale of confectionery in a gift package is a trade commonplace. And the gift package accounts for an important portion of total confectionery sales.



Bohack's baked ready-to-eat ham in the same decorative wrap minus the carry-away carton has been a regular in a Bohack store since the holidays. It has been purchased throughout this year by many who were on the receiving end of last year's gift package. The carry-away gift package will again be featured by Bohack stores this year.

New or unusual products of premium quality or costly ingredients usually meet resistance in the majority of markets. Custom and the food budget fix the price range of foods which make up the daily meal. Though the purse strings may loosen for "special occasions," price limitations are more rigid than those placed on the purchase of gifts. Experience is proving that properly packaged foods make an acceptable prize or personal gift. Quality foods which require a premium price commensurate with quality and value often create a profitable market when packaged to persuade purchase-for-gifting, after failure to gain acceptance in normal competition on the grocer's shelf.

The use of the gift package is not confined to holiday occasions nor is it limited to any class of food. Colorado Celery, Inc., packaged in a colorful folding waterproof carton 12 stalks of celery, each stalk individually wrapped in parchment surrounded by shredded transparent cellulose. These cartons of celery were offered as gift packages and shipped as far as 1,000 miles from Denver. Gift-package sales accounted for the movement of 25,000 cartons during the month of December, 1939.

Packaging to inspire purchase-for-gifting is packaging which few food manufacturers can afford to overlook.

This article will be followed in coming months by several which will discuss other special types of packaging.—THE EDITORS.

Hints and Hurdles

Light weight streamlined bottles with exterior closures recently adopted by New York milk distributors.

Public Relations Utopia —Milk Without a Gurgle

The rebellion of a segment of the consumer market against the existing order of consumer goods distribution has made some food manufacturers sensitive to the consumer's slightest whim. No one in the food industry has been panned more than the milk distributors. It is not surprising, therefore, to find them supersensitive to consumer complaints and demands.

Several years ago, as the result of consumer protestations, New York's Mayor LaGuardia issued a ban on noise. Somewhat tardily but nonetheless sincerely, several of New York's milk distributors have gone the limit to comply. The result is a new "silent" milk container which takes the gurgle out of milk. The milk gurgle more than shrieking brakes, wailing sirens, roaring subways or rattling ells had been the cause of frayed nerves and sleeplessness. The milk gurgle was everywhere. It penetrated the quiet suburb and the soundproof building. Now it is banished. Allah be praised! Consumers need no longer fear waking the baby or disturbing the neighbors when they pour milk from the bottle.

The new shorter-in-height, lighter-in-weight bottle is capped with a more sanitary closure than the old "standard." These improvements will be welcomed by consumers. Most of all they will adore the bottle that silences the dread "milk bottle gurgle."

War on Trade Barriers Seen as Duty of Industry

In a recent address, James W. Young, director, Bureau of Foreign and Domestic Commerce, Washington, stated that "an absolute essential to the success of our defense program is a full-functioning national economy. . . . If we can secure such a full-working economy, the load of this national defense program will be relatively easy to carry. . . . We *must* secure it, and any barrier to that end *must* come down.

"This is where you, individually and collectively, can help. Because in your state and my state, and in every state in the Union, we have allowed to be erected, almost without our being conscious of it, a whole host of barriers to such a full-functioning economy.

"These barriers are laws, passed by the individual state, which have come to be known by the common term 'trade barriers.' Think of it! We, the greatest business nation on earth, have allowed to be erected barriers, actual barriers, which stop or slow up or strangle trade. We have done that as definitely as though we had erected physical barriers around our highways and other trade routes. We have done that in a country whose motto has been, 'United we stand, divided we fall.' We cannot afford such nonsense any longer. The dangers we face are too real. They consist not only of the dangers of military action in this hemisphere, but of the internal dangers from foreign ideologies."

This warning comes from the director of a federal bureau. It was a federal law, the federal margarine law, which started the trade-barrier snowball rolling. Producers, and industry too, have kept it moving at a lively rate with the addition of numerous barrier laws. Neither producer nor industry has made any noticeable effort to halt the momentum of trade-barrier laws.

The councils of state goverments, the Department of Agriculture, the Department of Commerce and other of the federal bureaus view the situation with alarm and are exerting strong effort to eradicate barrier evils. TNEC is investigating. This effort is one thing government is trying to do for the *benefit of business.*

Neither government nor business wants the situation corrected "by law" through the enforcement of controls. Action to revise or rescind existing barrier laws should come from industry and producers acting jointly, or at least cooperatively.

It is very heartening, therefore, to notice that a number of large dairy interests cooperating with the National Defense Advisory Commission will make an effort to correct abuses of inspection and licensing laws in various states. Among the objectives is the establishment of uniform inspection standards acceptable throughout the country. The dairy industry has been seriously handicapped by barrier legislation. The industry should be among the first to act against barrier laws. It is to be hoped, however, that other industries not so seriously affected will nonetheless give active aid in removing these un-American laws.

Get Idea From Florists —Send Candy by Telegraph

"FLOWERS by telegraph" opened a vast and profitable new market for florists. That was years ago. And now, through a cooperative plan between manufacturers, jobbers and retailers, candy opens the "by-telegraph" market.

This new candy-merchandising plan should contribute much to expanding confectionery sales. And once again one industry borrows a practical idea from another industry—a page from the book of merchandising experience.

It is the belief of FOOD INDUSTRIES that many of the commonplace practices of each branch of the food industry have useful and profitable application in other branches. The baker can learn from the meat packer, the meat packer from the brewer. Each industry book contains pages of profitable ideas which can be applied to other industries. This is true of both distribution ideas and production ideas.

Rubber Bag in a Box New Container for Frozen Foods

Prevents oxidation, mold growth, odor contamination and freezer burn

In its May, 1939, issue, page 250, FOOD INDUSTRIES discussed latex rubber as a frozen food container. At that time poultry was encased in a chilled latex rubber bag shrunk to the carcass by vacuum then heated to restore the bag's elasticity and transparency. The application of the latex rubber bag to quick frozen poultry was important because this type of container prevented oxidation, mold growth, odor contamination and freezer burn as a result of dehydration.

Recently an adaptation of the latex rubber bag to a fiberboard carton permits its use as a container for frozen foods other than poultry, particularly liquids that are to be frozen. One food manufacturer is experimenting with this new type of container for freezing and storage of frozen eggs.

The mouth of the latex rubber bag is stretched over a specially designed fiberboard collar. This assembly is placed in and supported on a fiberboard outer container. The liquid to be frozen (eggs, fruit juices, etc.) is readily poured through the large opening provided by the collar mouth. When the bag is filled, the weight of the liquid stretches the latex bag out to fit the space within the carton. When the container has been filled the collar is twisted several times to make an airtight seal and then fitted into the fiberboard carton. Once the carton is closed, the collar is secured against untwisting. The new container is known as the "Cry-O-Pak."

Photographs by courtesy of Container Corporation of America.

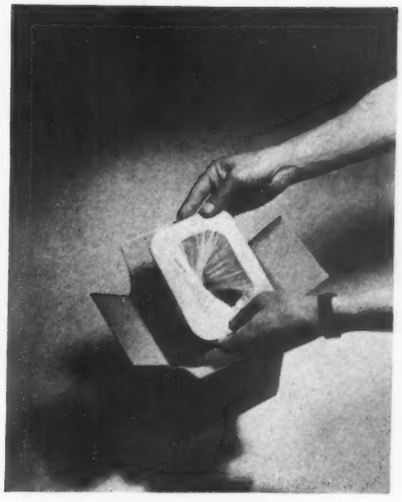
Before the bag is filled the mouth is stretched over a specially designed fiberboard collar.

The assembly is placed in and supported on the fiberboard outer container. The liquid or semifluid food to be frozen is readily poured through the opening provided by the collar mouth.

The filled bag fits the contour of the outer container. Twisting the collar several times seals the latex bag airtight.

The defrosted content of the container is readily removed by pouring or dipping.

The collar is fitted into the carton. Once the carton is closed the collar is secured against untwisting.



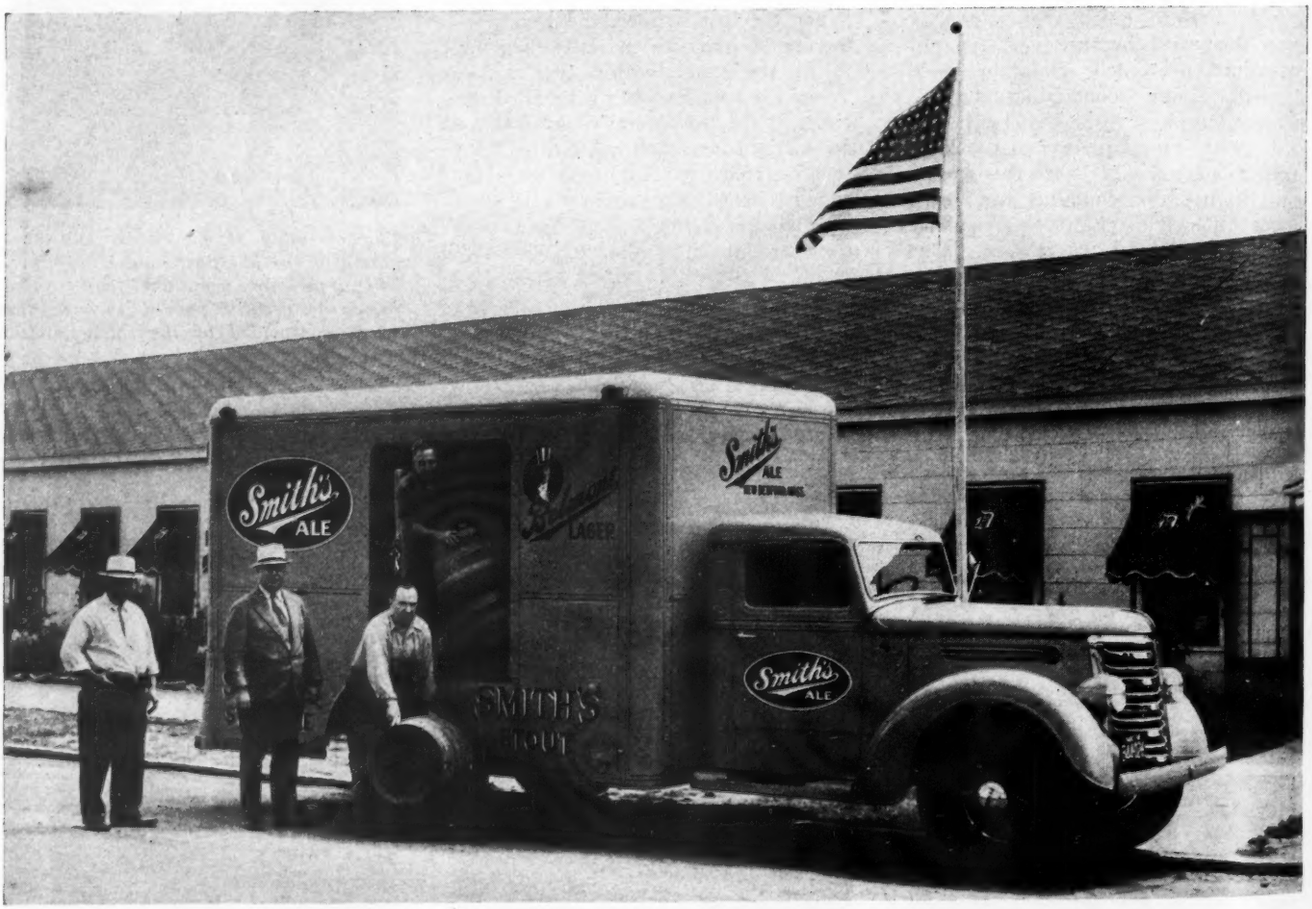
DUAL PURPOSE TRUCK Simplifies Distribution

Brewery body carries cases and kegs at same time

DESIGNED to carry mixed or combination loads of beer in cases and in kegs, the brewery truck body shown in the accompanying illustrations is an unusual distribution unit. It is of the closed panel type with double rear doors and openings on each side with two removable vertical stakes held in place by three horizontal chains.

Panel bodies for the delivery of beer in cases are the rule rather than the exception. Similarly, open, flare-sided bodies for handling beer in kegs are common. But a body intended to carry both cases and kegs presents problems not only in the design of the structure itself but also in the loading at the brewery and the unloading of the goods out on the delivery routes. Smith Bros., Inc., New Bedford, Mass., solved these problems in the new type of combination-load body pictured herewith. Its successful operation to date presages a change in the trend of brewery body design because of the advantages obtained.

In the first place, the panel body provides protection for the goods from the elements—sun in the summer and snow in the winter. Most brewers believe that malt beverages, particularly draft beer, should never be subjected to the heat of the sun. With the former type of open bodies for handling beer in kegs, such protection against the sun has usually been provided through the use of tarpaulin covers. While the ease of loading and unloading led to the popularity of the open type keg body, the use of tarpaulins has been more or less of a nuisance and of hit-and-miss protection value. The permanent roof of



A low drop for kegs beween the body floor and the ground is another feature of the combination keg and case beer body.

The body was built under the Lindsay structure plan by Providence (R.I.) Body Co.

Easy unloading is one of the features of this new combination keg and case beer panel body. Cases may be unloaded through the side openings or through full-width rear doors.

the panel body provides this protection at once and for all time. In addition, the ease of loading and unloading, which is an attribute of the open type keg body, is retained by the openings on each side of the new body, near the front.

The kegs are loaded in the front of the body and the cases in the rear. The kegs are unloaded through the side openings directly off the body floor. This method of unloading is easier than from a flare-sided open body since the floor of the body is closer to the ground than the top of the flareboard sides. This low drop in unloading is shown in one of the accompanying views.

To keep the kegs from falling out of the opening while the truck is in motion, each opening is provided with two removable stakes chained together as shown. By providing openings on both sides of the body, curb unloading may be made from the left side on one-way streets.

The beer in cases is carried in the rear end of the body. On small deliveries, the cases may be unloaded through the side openings. On large deliveries, the truck may be backed up to the unloading platform and the cases removed through the full-width rear doors.

THE panel type body also protects the case beer against theft. The closed rear doors and the chained stakes in the side openings make it most difficult for the theft of bottled beer either while the truck is in transit or when the driver is absent while carrying goods into the premises at the point of delivery.

A side opening on the left permits curb unloading on one-way streets. Recessed steps in the body skirting on the sides and in the rear make it easy for the driver to get in and out of the body. The vehicle is painted yellow, with black lettering.

The body is of the light weight Lindsay structure design as furnished by Dry Zero Corp., Chicago, and was built by Providence Body Co., Providence, R. I. Its inside dimensions are 12 ft. 6 in. long; 7 ft. 4 in. wide; and 6 ft. 6 in. high. When carrying straight loads of cases, 200 may be loaded. Sixty half-barrels may be carried when the entire load is in kegs.

To speed up loading at the brewery, the body floor is clear and without wheel housings. The inside of the body is finished with pressed-steel slats of the body builders' own fabrication. These are stronger, lighter and of longer life as compared with the ordinary type of wood slats.

To enhance the general appearance of the body by a proper proportion between length and height, the latter is made to appear greater through the medium of a bottom skirting below the body floor down to a line flush with the cab running board. To enable the driver to get in and out of the body easily, recessed steps are provided in the skirting on each side under the side opening and also in the rear, as shown in the accompanying views.

The body shown is mounted on a Federal chassis, and it and the separate truck cab and engine hood, fenders and wheels are painted a pleasing yellow color. The lettering and trademarks are in a contrasting black.

The vehicle has a maximum load capacity of six tons, and to secure this payload without too great an overloading of the tires, the Lindsay type of construction was employed to provide a body of light weight.

As explained in greater detail in FOOD INDUSTRIES, September, 1939, page 508, the Lindsay structure design provides a body of light weight with strength comparable to a body of the same size built along conventional lines. In the Lindsay design, the side panels are not mere coverings to enclose the load, but are pre-tensed, or put under tension, by means of wedge-shaped fittings along their edges. By this means, the panels become a structural part of the body and reduce its weight by requiring framing of smaller size.

The Food Industry News

Sweetener Controversy Gets Official Airing In Hearing on Canned Fruits

FSA hears arguments on which it will base regulations governing use of different sweetening agents

On September 16 the Food and Drug Administration opened an extended series of hearings with respect to canned fruits. The primary purpose was a redetermination under FSA of the conditions to be set as to the use of different sweetening agents and the labeling of containers with respect to these ingredients. The proponents of corn sirup, corn sugar and certain invert sirups took the initiative in requesting greater freedom of use and exemption from certain label declarations first prescribed by the Food and Drug Administration last spring.

This hearing constituted a full review of the sugar controversy on the basis of which FSA can formulate its policy. Advocates of corn carbohydrates urged that the replacement of some part of the sucrose with either dextrose or corn sirup be permitted on the basis of equal dry weights. Vigorous objection was made to the proposal of certain technical men of the Food and Drug Administration who had written into the first draft of the standards the requirement that 1½ lb. of these replacement sweeteners must be used for each pound of sucrose omitted. That theory of producing equal sweetness was attacked on several grounds. It was argued that this would not represent a true measure of the sweetness in concentrated sirups. It was also argued that an equal dry weight gave equal food value, which is what the consumer wishes from the sweetener. And it was further argued, with support by certain canner spokesmen, that the canner should have the freedom of choice as to how much sweetener he should use, and what kind, so long as he does not depreciate the food value below that normally corresponding to the density of sirup indicated.

Spokesmen for various invert sirups similarly argued for greater freedom of use of their products, notably with reference to the ash content. They too wish freedom to use their type of sweetener without any distinctive label declaration. Representatives of the sugar refiners, continuing the defense of their type of sweetening agent, further introduced testimony urging that all sweetening agents other than sucrose be declared on the label.

FSA officials hope that this series of hearings will enable them to formulate and promulgate standards for canned fruits which are reasonably acceptable to all interested parties. Only by such means can they escape the necessity of further defense of the standards in the Circuit Court of Appeals to which sugar refiners had taken this case last spring. The Court is withholding further action until FSA has a chance to review the hearings of September.

(Most of the fundamental aspects of this controversy were reviewed in the pages of FOOD INDUSTRIES last month, page 36.)

Catchup Packers Disagree On Benzoate of Soda

Some want standards amended to permit use of preservative

California tomato catchup manufacturers, under the leadership of the Canners League, appeared at the hearings of September 11, urging permission to use benzoate of soda as a preservative in tomato catchup with label declaration. These petitioners indicated that their desire for use of the preservative relates primarily to the goods to be sold in large containers. Such catchup is used by institutions for filling small bottles or cruets for table use; it is used in manufacturing other foods of which the catchup is an ingredient; or it is marketed by the manufacturer to dealers or others desiring to repackage it in small containers for further sale. The petitioners indicated that the Canners League membership did not generally plan to use any such preservative in the catchup bottled originally in small retail containers.

Eastern manufacturers and consumer spokesmen appeared in opposition to the request. Some of the opposition was based solely on emotional appeal, such as Mrs. Harvey W. Wiley's remark: "Let's not have benzoate of soda in our catchup any more." More serious discussion of a technical nature revolved around the question as to the desirable or necessary concentration of catchup to make the use of this added preservative unnecessary for normal conditions.

Dr. Marguerite Schmidt of Gibbs & Co., Inc., Baltimore, testified regarding the chemical significance of the preservative. She was the major technical expert representing Tri-State Packers Association, which does not wish the catchup standard to permit the use of benzoate of soda. She testified that a catchup containing 25 percent total solids would not require benzoate for protection under normal conditions of storage or use. But at elevated temperature or long exposure, such catchup, or even that treated with small quantities of benzoate of soda, would still spoil. It was also pointed out that much of the catchup marketed has a lower concentration than this. Some government specifications require no higher than 19 percent total solids.

It appears unlikely that the standard will be modified on the basis of this hearing alone.

HEADS SHRIMP PROMOTION

R. R. Rice, of Rice Bros., Aransas Pass, Tex., has been named president of the newly organized Shrimp Canners National Advertising Association. This organization has launched a national advertising and promotional campaign including an extensive trade mailing of merchandise kits, a broad consumer educational program in magazines, newspapers and on the air, and special recipe and menu promotion directed to home economists.

THE NASH CLEAN-AIR COMPRESSOR

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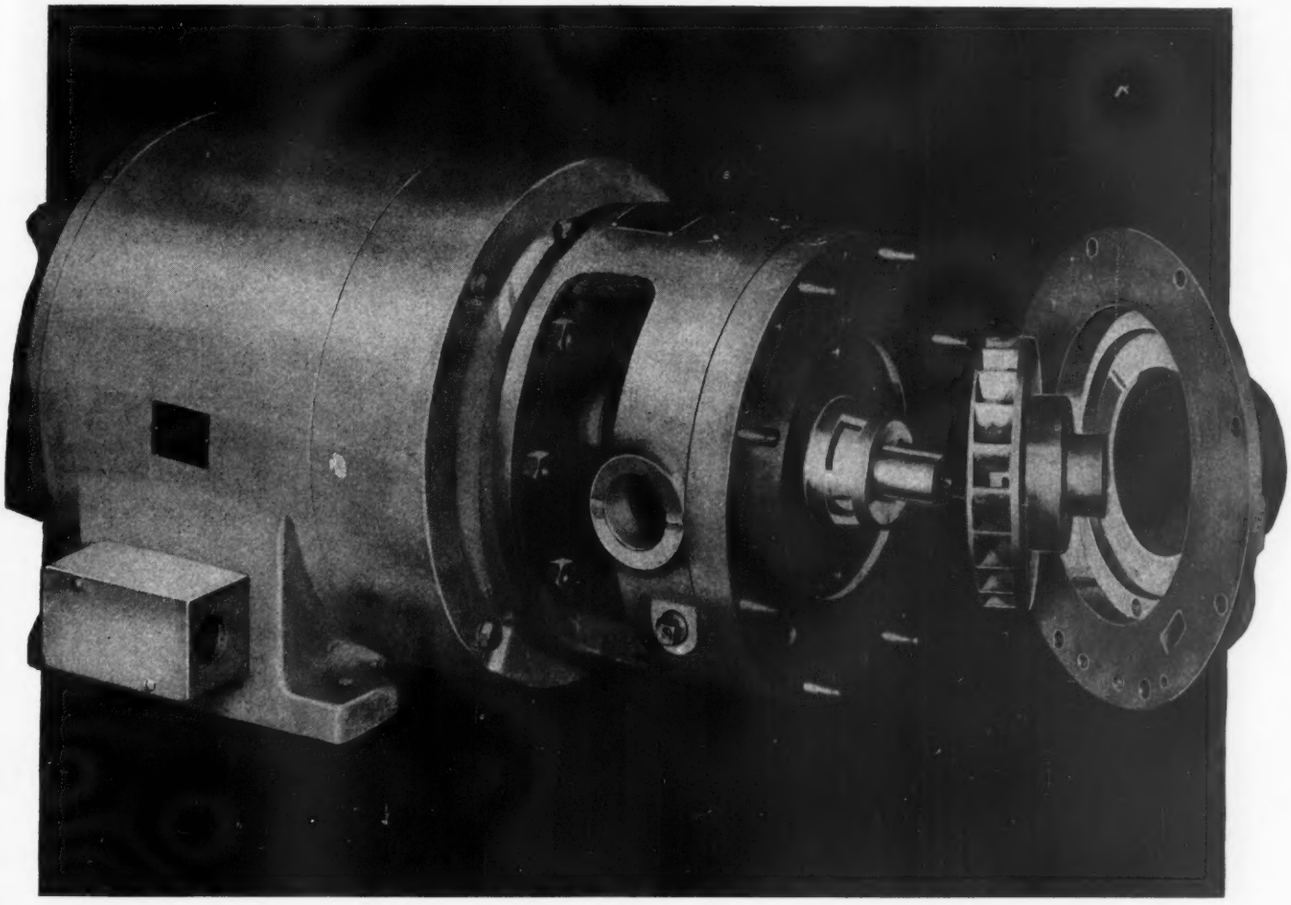

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Food Technologists Report New Knowledge At Meeting of Chemical Society

Discuss findings about fruits and vegetables, wine, fats, and oils, sugar refining and vitamin C milk

New technological information on foods and food processing was delivered in frequent doses at the meeting of American Chemical Society in Detroit, September 9 to 13.

That nearly twice as much vitamin A is destroyed in lettuce stored in the conventional refrigerator as is lost in a special high-humidity refrigerator was a discovery reported by Prof. Robert S. Harris and L. Malcom Mosher of Massachusetts Institute of Technology. The humidity in the special refrigerator was 88 percent and the rate of air movement only 2 ft. per minute. The loss of vitamin A from fresh lettuce corresponds to the amount of moisture loss and is accentuated as wilting becomes severe.

The strawberry contains twice as much vitamin C as orange juice. That startling bit of new information was reported by Mary Mann Kirk and Dr. D. K. Tressler, New York State Agritultural Experiment Station. And raspberries and turnips rank with tomatoes in vitamin C content; blueberries, plums and peaches furnish smaller amounts; while blackberries, cherries and dewberries contain little more than a trace. A new method making possible the estimation of vitamin C in highly colored products was devised by Kirk and Tressler.

Sulphur dioxide has been found to be not only an excellent antioxidant but also a preservative of color and vitamin C content in fruit products, according to a paper by Dr. M. A. Joslyn of the University of California Agrisultural Experiment Station. This is contrary to several recently published claims that sulphur dioxide destroys vitamin C in fruit juices such as grape and orange.

Elimination of air from wine and from the headspace of the bottled product reduces changes in the wine, improving its keeping quality, according to C. S. Pederson, New York State Agricultural Experiment Station, and Harry E. Goresline, A. L. Curl and E. A. Beavens, Bureau of Agricultural Chemistry and Engineering. Little deterioration was observed in wine filled into the bottles hot and immediately closed to produce a vacuum in the bottle on cooling.

When vitamin E is added in small amounts to animal fat, such as lard, the product remains fresh much longer, behaving like vegetable oil, which is rich in vitamin E. The antioxidant properties of this vitamin were discussed by Dr. Calvin Golumbic, State University of Iowa.

Bauxite, a naturally occurring hydrated oxide of aluminum, has been thermally activated to produce a highly efficient adsorbent for the refining of sugar sirups and liquors. This was reported by W. A. LaLande, Jr.

The most serious losses in the anti-scorbutic activity of milk during processing and delivery were caused by copper and by exposure to light in studies reported by Warren W. Woessner, K. G. Weckel and H. A. Schuette, University of Wisconsin. If steps be taken to eliminate these disturbing factors, production of a vitamin C-fortified milk on a commercial scale and its marketing through normal channels should be practical, the studies indicate. Pasteurization by holder methods was found to cause a 20 percent loss of total ascorbic acid.

Continuous Grading Begun Experimentally by AMS

Certifies "US" label for canned fruits and vegetables

Continuous inspection and grading of canned fruits and vegetables has been inaugurated by Agricultural Marketing Service on an experimental basis.

The first four plants in which this work is in progress are those of Curtice Bros., Mt. Morris, N. Y., packing corn; Cherry Growers, Inc., Traverse City, Mich., packing red sour pitted cherries; U. S. Products Co., San Jose, Calif., packing apricots, sweet cherries, peaches, pears, fruits for salad and fruit cocktail; and Schuckl & Co., Inc., Sunnyvale, Calif., packing apricots, sweet cherries, peaches, pears, fruits for salad, fruit cocktail, asparagus, baked beans, tomatoes and soups. Florida Fruit Canners, Frostproof, Fla., packing grapefruit segments and juice, will soon be added to this list.

The entire pack of each of the indicated commodities has been under the supervision of the AMS inspectors. Further extension of this service is dependent not only on the availability of a sufficiently large staff of inspectors but also on the consumer reaction to the products. Investigation along the latter line has been planned for the coming winter season. The available supply of inspected and graded canned goods remaining for study is much smaller than hoped for, however. This is occasioned in part by slightly subnormal crops; but it is principally due to exceptionally large early sale of these graded goods.

The canners bear the expense of this AMS inspection by reimbursing the government for inspectors' salaries, incidental expenses and an agreed-upon administrative overhead. A corps of inspectors is available on each shift and is responsible for the continuous inspection. The supervising inspector at each plant is responsible for the grading.

This work is similar in many respects to the continuous inspection service at meat packing plants by BAI. However, it goes further in that the food products are graded as well as inspected. The resulting grade is displayed both on the label and by an embossed shield on the cans or by a blown-into-glass emblem on glass containers.

The canner may then label his product "U.S. Grade A," or whatever grade it may be. Canners who do not have this inspection service may label their products "Grade A," "Grade B," etc., but are not permitted to use the prefix "U.S."

28-week Labor Exemption Allowed Canners

Attempts of labor unions to merge the statutory and seasonal 14-week exemption periods under the Wage-hour Act for first processing and canning factories handling fresh fruits and vegetables have failed. Administrator Fleming denied a rehearing petition and ruled the two exemption periods legally must run consecutively—giving these plants a total of 28 weeks exemption. The administrator's ruling was the last step to make the seasonal exemption period effective.

The 14-week seasonal exemption granted to allied warehouses as a result of the same set of hearings became effective October 1, except for apple and pear warehouses, for which the effective date is December 1.

Action Taken by the FTC In Four Food Cases

Pricing, brokerage, quality and resale subjects of decisions

Several phases of food manufacture and marketing were under fire at Federal Trade Commission headquarters last month. The pricing of salt, the taking of brokerage fees, the quality of preserves and questions of resale price maintenance had attention through four independent actions or reports by the Commission.

For some time the preserve industry has wanted to stop certain manufacturers from making products containing less than 45 parts of fruit per 55 parts of sweetener. One such action expected late in September was a cease and desist action of FTC. This evidences clearly the continuance of activity by the Commission on this quality standard in addition to Food and Drug Administration actions under a different law.

A group of companies selling salt was subject to a complaint action under the Robinson Patman Law for two types of pricing. In one group

of cases discounts were given according to the total consumption of salt by a purchaser irrespective of the number of companies from which it is bought. Such pricing of "split business" is ruled to be illegal. In another group of cases, price discounts were based on the total quantity of salt delivered to all the branches or subsidiaries of a customer without regard to the cost of such selling. This type of "combine selling" is also condemned. Replies by the salt companies must be made within 20 days of the service of the notice which was published September 14.

Continuing action under the Robinson Patman Law the Commission further undertakes to restrain the taking of certain brokerage fees by food merchandising units which serve both producers and sellers. Those merchandising canned fruits and vegetables are directly involved by this action.

Questions of resale price maintenance have been studied by the Commission and an extended report of the effect on prices of the Miller-Tydings Law has been prepared. It is expected that this report will be used in the policing of prices both by the Commission and by Miss Elliott of the defense group.

Issues New Tuna Trade Rules

Revised trade practice rules for the tuna industry were issued on August 27 by the Federal Trade Commission. Supplanting the original rules issued on March 22, the new code of industry behavior has changes in Rules 1, 7 and 19 pertaining, respectively, to definitions, misrepresentation of the term "tonno", etc., and consignment distribution. Objection to several of the rules has been expressed in a brief by National American Wholesale Grocers' Association.

New Policy Established For Dietary Foods

If no health claims are made special labels not necessary

Definite policy announcement regarding dietary foods and their labeling accompanied the formal public notice of the hearing on proposed standards for dietary properties of foods. The hearings will begin October 7.

The most important policy announcement at this early stage appears to be the ruling that all food producers can "exercise their own choice as to whether or not they subject their products to the special labeling requirements." In effect, the regulation says that if a producer makes any claims regarding the corrective character of his product, regarding its vitamin content, or special mineral value, or that it is an infant food, then the commodity must be subject to special label requirements. If there is no such claim, the food does not come under these standards in many circumstances.

Emphasis on this restriction of the new proposed regulations is important because many industry representatives have been needlessly worried. They had the impression from the earlier promulgation of proposed standards by the Food and Drug Administration that such ordinary commodities as milk, cheese and butter, as well as others, were to be intimately regulated and would have to state many details of composition. That is not the intention of FSA.

Food Plant Installs Synthetic Daylight

Fluorescent lamps give light of better quality and intensity. Cut power consumption and reduce heat radiation

Fluorescent lighting has been installed in the Honolulu plant of Hawaiian Pineapple Co., Ltd., to improve the quality of the product, and much stronger light is obtained with less power consumption and lower heat radiation than with the incandescent lamps previously used.

No less than 576 two-tube units light the 500x50-ft. preparation department of the cannery and the siruping and double-seaming departments, where as many as 4,335,726 cans are put through in a day. There is a light intensity of 20 foot-candles over the tables where the pineapple is graded to secure uniformity of color and texture and perfection in general. The intensity over the trimming tables is 35 foot-candles.

The 576 lamps, which are 100-watt units, replaced 245 500-watt glasssteel diffusers which gave a light intensity of 6 foot-candles. The change cut the power load from 122.5 to 57.6 kw. and reduced the energy radiated as heat from 95.5 kw. to 33 kw.

The fixtures, which are only 11 ft. 7 in. above the floor, are arranged in lines with 6 in. of space between the ends of the units and with the lines spaced 10 ft. apart over the trimming tables and 20 ft. apart over the packing tables—packers work on one side of the tables only. Tests showed that the best location for the lamps is back of the operators.

Cloudy spots appearing on tomatoes at ripening time are the result of the feeding of certain insects belonging to the family of pentatomides. This was discovered in studies conducted at the New York Agricultural Experiment Station at Geneva. Injury to the tomato results largely from extraction of juices and the partial destruction of some of the fruit tissues.

FSA's Preserve Standards Displease Industry

Depart greatly from preliminary findings issued by F&DA

Official standards for preserves, jellies and fruit butters were promulgated at the end of August by the Federal Security Agency and published on September 5. The effective date is December 4. No one seems satisfied with the new standards. They depart radically from the form of the preliminary findings released by the Food and Drug Administration.

In releasing these final standards the FSA specifically stated that a further amendment would be arranged should the sweetener controversy now being heard in other proceedings make it desirable to fix a broad plan differing from the one here followed in respect to sweetening ingredients. Preservers were assured, however, that labels prepared under these standards could be used up "in reasonable quantities" if a change in label requirements was made later by FSA.

In effect, the new standards continue practically the old Department of Agriculture policy with reference to sweeteners. They permit interchangeable use of sucrose and dextrose without label declaration. They do require label declaration of other optional sweeteners, those containing corn sirup, honey or mixtures of these with dextrose and sucrose. This finding is regarded as unsatisfactory both by many of the preservers and by the spokesmen for the corn carbohydrates.

In the standards which permit certain types of invert sugar sirup, this material is so defined as to limit the type of liquid sugars and sugar sirups which may be employed. This is done through the naming of a limit on the ash content of this sweetener at "not more than 0.3 percent of its solids content." This feature is objected to by certain of the sirup and liquid-sugar makers.

The standards with respect to fruit butters made from dried fruit is very disappointing to National Preservers Association. That industry agency has argued that apple butter made from dried apples is indistinguishable from that made from fresh apples. They argue, therefore, that such a product should be called apple butter, not "Dried Apple Butter." The new standard will, industry spokesmen state, practically prevent continuance of much of the present manufacturing practice because of the required label distinction.

Further conferences were held during September between various industry representatives and the officials who are handling this case. It was evident that some further changes would be necessary.

"National Coffee Association" is the new name adopted by Associated Coffee Industries of America. The change was announced at the association's annual convention last month. At this meeting it was reported that a coffee consumption of 20 lb. per capita will be reached soon, and in the future the industry will promote more coffee drinking at lunch and dinner. The limit at breakfast has about been reached. George C. Thierbach, San Francisco, was reelected president of the association.

FOR BETTER QUALITY

To help the dairies get cleaner cream, this poster has been developed by the dairy industry as educational literature for farmers. Printed in bright red and blue colors on a 15x23-in. sheet, the poster is put up in cream buying stations and creameries. It can be obtained through American Butter Institute, Chicago, at $3.50 a hundred.

Distribution of Surplus Expanding Rapidly

Surplus commodity distribution programs among needy families continue to grow by leaps and bounds. By the end of September, the number of cities designated for the food stamp plan had passed the 170 mark, with three to five new localities being added weekly. Expenditures have passed the $5,000,000-a-month level and are expected to reach double that figure in more than 200 designated areas around the end of the year. Current appropriations make this the practical limit for the 1940-41 fiscal year.

School lunch programs, which last winter reached three million children, are being planned on double that scale this winter. Surplus foods distributed in school lunches last winter amounted to 100,000,000 lb.

The penny-a-half-pint milk program started experimentally in Chicago summer school sessions can be expected to be extended this winter, particularly in several metropolitan areas. Hand-in-hand with this will be continued expansion of the five- and seven-cent a quart relief milk distribution offered relief families in Boston, Chicago, New Orleans and the District of Columbia.

Proposed Flour Standards Taken Up at Hearing

Industry presents objections to certain of the provisions

Proposed standards for flour and related products were considered at a hearing early in September. On September 17, however, the hearing was recessed until November 12 for the purpose of introducing at that later date further testimony with respect to vitamin and mineral addition to these products. However, this further discussion will not relate to all of the products, and accordingly the record has been closed on durum flour, whole wheat flour, cracked wheat, crushed wheat and whole durum wheat flour. October 28 has been set as the date by which briefs should be submitted.

Millers National Federation, under the leadership of C. M. Hardenbergh, presented the industry's case at the hearing. Considerable evidence was introduced to show that the addition of vitamins and minerals to flour was present recognized practice. Some doubt was expressed by the government representatives, however, that such optional ingredients might be used without changing the name of the product to "fortified flour" or "restored flour" or "enriched flour." It was even suggested that a separate standard be established for an entirely new product in which these optional nutritional ingredients would be included if declared on the label.

In the case of self-rising flour, the government-proposed standards recommended limiting the self-rising ingredients to monocalcium phosphate, soda and salt. Considerable evidence was presented by the industrial representatives that other self-rising ingredients were now used, prominent among which was sodium acid pyrophosphate. The industry also suggested a fixed 0.9 percent ash content for low protein white flours (under 12 percent protein), rather than the sliding-scale proposal of F&DA.

Because of the present wide variation in granular specifications of cracked wheat it was urged by the Federation that no standard be set for this product. The argument was that the present demand is for a wide range of products and that a product standardized as proposed would limit the miller's customers' choice to a very narrow range. A corollary suggestion of the Federation was that crushed wheat be included in the standardization of whole wheat flour. By establishing a size above which the product would be known as "coarse" and below which it would be known as "fine," a single standard should suffice for both products.

Revises Tomato Standards

Revised standards for grades of canned tomatoes, promulgated by Agricultural Marketing Service, became effective September 16. The new stand-

ards set minimum limits in three grades for drained weight, percentages of whole or almost whole tomatoes, small and large pieces in the pack, color and defects. Canned tomatoes failing to meet the requirements of any of the three grades, or the fill of container and quality standards promulgated under the Federal Food, Drug and Cosmetic Act, are designated as "substandard."

Answers to Food Law Questions

Interpretative Opinions from F&DA Letters to the Industry

The Food and Drug Administration continues informally to reveal its policy in letters written to trade inquirers. The following material continues the series of abstracts which began in the April issue of FOOD INDUSTRIES.

ABSTRACTS

179. Process *cheese* not included in temporary exemption from ingredient declaration should conform to Food and Drugs Act standards.

180. If plain waxed *wrappers* around loaves of Munster and Tilsit *cheeses* are removed when product is exposed for sale, such loaves are not food in package form; swiss cheese loaves packed in *tubs* are food in package form, and should be labeled.

181. Ingredient list on canned *dog-food* may declare "meat byproducts" in lieu of declaring each byproduct; water, if added to product, should be declared.

182. Cottage *cheese* in tubs is food in package form; cottage cheese is included in temporary exemption from ingredient declaration; if other ingredients than curd and salt are present, they should be declared as "Cream and Spices Added".

183. Use of the word "fresh" is undesirable on labels of canned foods.

184. If mandatory labeling appears on package containing them, tissue paper *wrappers* on individual fruits or vegetables need not be labeled, except that *artificial color* should be declared on the individual wrappers in any event; however, if wrappers bear any descriptive information or representations, complete labeling is required.

185. "Zucca" melon, artificially colored and flavored to resemble fruit, should not be used in any food product to resemble citron, lemon, orange or cherry particles.

186. Hexamethylenetetramine (which forms formaldehyde in acid medium) is inappropriate as a *preservative* in codfish caviar.

187. If synthetic esters, ketones and aldehydes are grouped in imitation *flavor* ingredient statement under these group names, one member of each group should be specifically named, as "Ethyl acetate and other esters."

188. Chopped *fish* packed in sausage casing should not be designated as "sausage."

189. Sacks of *feed* may declare ingredients on tags instead of on face of sack.

190. The term "liquid sugar" is inappropriate as designation for partially inverted sugar *sirup*.

191. The term "ice cream powder" should be restricted to products which will make ice cream with addition of water only.

192. The unqualified expression "telephone" to indicate the sieve size of canned *peas* constitutes misbranding.

193. "Italian Style Peeled Tomatoes and Tomato Puree" should designate peeled tomatoes packed in tomato puree, each conforming to definitions for those standardized commodities.

194. The name "Grenadine" is unobjectionable on sirup containing a mixture of

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fruit juices having characteristic grenadine flavor and color.

195. If a *foreign language* is used on a label or in an accompanying circular, mandatory label information must be completely given in that language; however, use of a foreign language in a circular does not require use of a label panel in the same language.

196. Labeling of mixed assorted *nuts* might state, when ingredients vary, "Contains cashews, almonds and Brazil nuts—May also contain peanuts and pecans"; name of specific *oil* in which salted nuts are cooked need not be declared; specific name of nut in transparent-cellulose bag may be stated on an attached or inserted paper slip, when the same bag is used for different kinds of nuts at different times.

197. Chocolate flavored *malted milk* beverage, as dispensed, should contain at least ½ oz. of malted milk in 10 oz. of finished beverage.

198. "Extracted Honey" or "Strained Honey" implies honey in liquid form, not partially granulated.

199. Quantity of contents statements of *liquid foods* should be in terms of fluid measure; condensed or semi-solid foods to be diluted before using need not be expressed in fluid measure; use of both weight and fluid measure terms is recommended in latter case and is unobjectionable in any case.

200. The term "Supreme Quality" is unobjectionable on labels of food products of highest recognized grade; term "Fancy" has trade significance but no official meaning.

201. A *common carrier* who labels and distributes merchandise incurs the same responsibility as any interstate shipper or receiver.

202. No form of labeling would legalize canned tomatoes differing from the definition and standard of identity but whose general characteristics of appearance, taste, manner of packing and sale closely simulate those of the standardized food.

203. The specific *starch* used in a *salad dressing* need not be named on label unless required in interest of consumer understanding.

204. The essential oils of *spices* should be designated as "spice oil flavorings" or if desired to be more specific, "oil of cloves" (for example); the simpler term

SCHEDULE OF EVENTS

OCTOBER

2– 4—American Oil Chemists Society, Stevens Hotel, Chicago.
7–11—National Safety Congress, Stevens Hotel, Chicago.
8–11—American Public Health Association, Book Cadillac Hotel, Detroit.
10—Packaging Institute, Inc., Westchester Country Club, Rye, N. Y.
12–19—National Dairy Association, Harrisburg, Pa.
13–16—American Bakers Association, Hotel Sherman, Chicago.
13–20—National Wine Week.
14–16—National Association of Food Chains, Drake Hotel, Chicago.
19–24—Master Brewers Association, Municipal Auditorium, St. Louis.
20–23—National Association of Retail Ice Cream Manufacturers, Atlantic City, N. J.
20–24—American Dietetic Association, Pennsylvania Hotel, New York.
21–23—International Association of Milk Dealers, Haddon Hall, Atlantic City, N. J.
21–26—Dairy Industries Exposition, Atlantic City, N. J.
22–23—Association of Food and Drug Officials of the United States, New Orleans.
24–26—International Association of Ice Cream Manufacturers, Ambassador Hotel, Atlantic City, N. J.
28–Nov. 2—National Honey Week.

NOVEMBER

11–15—American Bottlers of Carbonated Beverages, convention and exposition, Music Hall, Cincinnati.
25–27—Associated Grocery Manufacturers of America, annual meeting, Waldorf-Astoria Hotel, New York, N. Y.

"spice flavoring" is ambiguous and may be misleading; spice extractives may be termed "spice extractives" or just "flavoring".

205. "Tomato hot sauce" has not been standardized; all ingredients must be declared on the label.

206. The use of *saccharine* or *dulcin* (paraphenetol carbamide) in food is held to constitute adulteration unless the article is clearly labeled to show that it contains a non-nutritive artificial sweetener, and that it is to be used only by those who must restrict their intake of ordinary sweets.

207. A suggested label for *vitamin-carrying oil* for human consumption: "Consists of natural vitamins A and D from a concentrate of fish liver oil blended with the fish oils and a pure edible vegetable oil"; the vitamin A and D content of such an oil, intended primarily to supply these vitamins, should also be accurately stated.

208. (Revoking 154, p. 67, August, 1940.) *Sodium bisulphite* is now regarded as a non-nutritive substance, and may not, therefore, be used in confectionery in any amount.

209. *Gelatin dessert* packages, to avoid charge of deception, should provide maximum fill with minimum of unavoidable unoccupied space.

210. A mixture of distilled and cider *vinegars* should be so labeled; it should not be called a distilled cider vinegar unless such were the fact.

Evaporated Milk Standard Gets Later Due Date

Full compliance with the new standard of identity for evaporated milk will not be required until March 1, 1941. Federal authorities discovered that it would not be practical to meet the effective date of September 30. They granted an extension on the request of Evaporated Milk Association.

Under old practice 7.8 percent of milk fat was required as a minimum; the new standard requires 7.9 percent. Some of the production at the surplus milk period of last summer was evaporated to meet the old standard, but might not meet the new one. Distribution of that material during the winter season would have been prevented if the new standard took effect before next spring. It was not deemed practical to remove the stock from cold storage for further concentration or other amendment. FSA took account of this and will permit distribution of present stocks without regard to the new standard for a few months longer.

Asks Lower Freight Rates

The battle of cottonseed producers for a fairer relationship of freight rates on their products flared again during September with the filing with the Interstate Commerce Commission of a petition by the National Cottonseed Products Association. The complaint, naming the Yazoo and Mississippi, Atlantic Coast Line, Chicago, Burlington and Quincy, Chicago Rock Island and Pacific, Gulf & Ship Island, Gulf Mobile & Northern, Illinois Central, Kansas City Southern and the Louisville and Nashville railroads, asks the ICC to order the carriers to establish "fair and reasonable" rates for handling cottonseed oil between all points in the U.S.

Process Patents Protected

Any food products made by patented processes can now be prevented from coming into the United States unless the owner of the U.S. patent gives permission for their entry. Congress has given this new broad protection to process patents by an act signed recently. This law closes a serious loophole that formerly existed in the patent system.

For ten years it has been illegal to import any product that was protected by a valid unexpired United States product patent. But the law giving that protection was drawn so loosely by Congress that the process patents of this country did not have comparable protection. Certain chemical firms and some of the mining interests were most concerned. But some food products made under patented processes, that formerly were open to similar import competition, are now protected.

To Study Oil Extraction

Search for better methods of extraction or improved solvents for removing oil from cottonseed will be the first assignment of the Department of Agriculture's Southern Regional Research laboratory at New Orleans when it opens soon, perhaps this month.

K. S. Markley and D. F. J. Lynch,

CAPITAL VIEWS

AFTER ELECTION –A political bombshell burst in Washington when Dr. Leopoldo Melo of the Argentine delegation to Havana stated on return home that President Roosevelt had encouraged him to believe that after election an arrangement would be made for U. S. purchase of more Argentine meat. No well-informed Washingtonian expects the Senate to ratify any such trade arrangement. Nevertheless, Washington knows that intensive studies are being made in several departments to see what the United States can do to help the Argentine in disposing of surplus corn, meat and meat animals, and probably wool. A similar effort to help Brazil in the disposal of coffee surpluses is planned, but without the comparable political significance. Hemisphere problems with respect to food are the most difficult, and politically the most dangerous.

SLACK FILL ACTIONS—Recent summaries of Food and Drug seizures of illegal food packages include large numbers of macaroni and related products. Apparently the Food and Drug Administration is getting tired of waiting for this industry to get rid of the needless excess space inside of containers. The Administration specialists clearly recognize the technical difficulties but cannot sit back forever waiting for improvement to begin. Undoubtedly more seizures will be made if evidence of real progress does not appear soon.

Far more sympathy is expressed for those dessert powder makers still struggling with the problem of satchel type of container. They have made some progress and are evidencing serious effort for more complete filling of outer packages. However, this and a dozen other commodities are still being closely watched at official headquarters.

FOOD BARTER—Uncle Sam wanted to trade to the British surplus manufactured food or agricultural surpluses in exchange for rubber. Many technical difficulties developed, not the least of which was the price at which our foods would be traded. As a consequence, the plan fell through, at least temporarily, and outright purchase of rubber is planned. Some folks think this was a serious mistake on the part of those advocating higher food prices. These critics say: "Instead of food the British now buy munitions with the money that the food industry could have taken in."

NEW REGULATIONS—Defense programs are setting up new export controls, priority programs, schemes for sabotage prevention, and new fiscal policies. These affect all industry to some extent, but thus far the food industries are fortunately escaping detailed attention. So long as there is good cooperation with the defense planners there will be no formal priorities anywhere, since voluntary policing and scheduling is better for both government and business. No foods are yet on either export control or emergency supply lists. And as yet there is no evidence that the government is going to make any special demands for unusual quantities of processed food that cannot be cared for through normal procurement. Food executives can thus sleep without the bad dreams of many of the more intimately "about-to-be regulated" munitions groups.

CONSUMER ORGANIZATION — Evidence continues to accumulate in Washington that Miss Harriet Elliott considers that the policing of food prices will require much more extensive consumer organization. The government, according to this office, "will not tolerate price increases" except in unusual circumstances; and the threat of pitiless publicity is the club carried conspicuously on these ladies' shoulders. There is a specific effort being made to get this new consumer stimulus back of compulsory grade labeling.

CONTAINER SHORTAGE—The inability of the government to accumulate reserve stocks of tin as fast as desired continues to worry Washington. This may mean that some substitutes for tin containers may possibly become important next year. Industrial executives are being quietly urged to be ready for such a contingency, but no immediate tin shortage is forecast. In fact, jitters on this subject are being quieted wherever noted.

BIGGER TAXES—It is already evident that all industry, regardless of "excess profits" will pay a higher base rate on earnings of 1940. This may hit food profits to the tune of about 24 percent, even though the earnings may not include any special increases above normal. And it is being whispered also that a still higher base rate may have to be fixed, even before the March 15 returns are mailed. Spending at 10 or 12 billion dollars per year cannot continue without paying substantially greater than recent tax rates.

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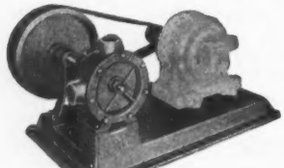
Bulletin 103-35 gives you just the real facts and specifications on Viking Standard Pumps for modern Food Factory service. NO WASTE READING.



LOOK FOR THIS TRADE MARK—THE SIGN OF A GENUINE VIKING.

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of the southern laboratory staff, estimate that from 5 to 7 percent of oil remains in most press cakes with today's methods of extraction. Reduction of this uncaptured oil to 1 percent would mean recovery of an additional 200 million pounds of oil annually, with a gross value of about $8,000,000, the two experts calculated.

Action on Food Standards Taken by FSA

The long-awaited fruit jam, jelly and butter standards appeared in the *Federal Register* of September 5, and will take effect on December 4.

On request of the Evaporated Milk Association, the effective date of the evaporated milk standard was postponed from September 30 to March 1, 1941. This order, applying only to Sec. *C* of Docket *7*, was printed in the *Federal Register* of September 10.

A new docket (No. 24) was announced in the *Federal Register* of September 5, proposing standards for the labeling of dietary foods. The hearings begin on October *7*. This reopens the action first announced on March 28 as Docket No. 15, but canceled when the Food and Drug Administration was transferred from the Department of Agriculture to the Federal Security Agency.

The tomato catchup amendment hearing was completed in one day, with September 24 agreed upon by all interested parties as the date by which briefs should be submitted.

The flour hearing lasted a week and two days and then recessed until November 12 with respect to wheat flour, self-rising flour, phosphated flour, semolina and farina. The record of the other five sections of this docket was closed, with October 28 set as the date by which briefs should be submitted.

(Elsewhere on these news pages are discussions of the technical details of the various standards.—*The Editors.*)

Food Shipped to Finland To Feed War Refugees

First shipments of foodstuffs bought from the $50,000,000 Congress appropriated last June for war-torn European refugees were being arranged late in September. The shipments are going to Finland, as reported under negotiation in the September issue of FOOD INDUSTRIES, and aggregate 15,000 tons of food, clothing and bedding valued at approximately $1,000,000.

All of the foodstuffs, valued at nearly $500,000, are being bought from the federal appropriation, as is some of the clothing and bedding. The Red Cross, designated as distribution agency for commodities purchased with the war relief fund, asked the Department of Agriculture to supply 250,000 bu. of wheat, 150,000 bu. of rye, 1,750,000 lb. of lard, 2,500,000 lb. of dried prunes, raisins and apples, 500,000 lb. of dried beans, 10,000 cases of cane sirup, and 12,500 cases of grapefruit juice. All of the relief items will be shipped on Finnish boats to Petsamo.

Construction News

	Pending (thousands)	Awarded September (thousands)	Total Awarded 1940 (thousands)
Bakery	$50	$248	$2,125
Beverages	240	80	6,204
Canning and Preserving	450	250	413
Cold Storage Plants	.....	40	670
Confectionery	.....	.....	570
Grain Mill Products	1,307	1,759	3,439
Ice Manufactured	.....	40	271
Meats and Meat Products	115	.....	1,555
Milk Products	215	120	1,569
Miscellaneous	865	300	4,996
	$3,242	$2,837	$21,812

Locker Plants Get Loans From Government

The Farm Credit Administration is now lending a helping hand to cooperative frozen food storage locker plants through loans made by the dozen Banks for Cooperatives. Up to now 13 loans have been made directly for locker plants, nearly three dozen other loans are for plants, usually creameries, which operate locker facilities.

The dollar value of the 13 loans is $85,500, and the estimated loan value of the byproduct plants exceeds $150,000. Eleven of the farmer cooperative lockers are in the St. Louis area, one in the St. Paul district and one in the Houston district.

Announces Dairy Courses

Four dairy short courses of a practical nature have been announced by Massachusetts State College, Amherst, Mass. The first, to run from January 20 to 25, will cover milk and cream testing and analyzing and inspecting of milk products; the second, January 27 to February 1, milk plant operation and manufacture of milk products from surplus milk; the third, from February 3 to 8, history and development of the ice cream industry and application of desirable practices in the ice cream field; fourth, February 10 to 15, intensive training for the experienced ice cream maker.

Poultry Charts Revised

Poultry marketing charts of the Agricultural Marketing Service, U. S. Department of Agriculture, have been revised. These picture the tentative standards for fowl and dressed birds, and describe the inspection of packaging and processing technics imposed by federal officials.

Food Exports Increase

Statistics for the foreign trade of the United States for July, 1940, the latest

month for which complete figures are available at this time, show that foreign trade in foods reversed itself for the first time this year, with exports higher and imports lower than in July, 1939. The increase in exports was 3 percent, while the falling off in imports was 4 percent.

Among products showing increased sales abroad were corn, cornstarch, lard, canned milk, salmon, sardines, canned baked beans, soybean oil and cottonseed oil.

Wheat Supplies Heavy

Production and carryover of wheat in the United States and Canada combine to produce an unprecedented wheat supply in the North American continent. United States production of wheat this year is now estimated at 783,560,000 bu., compared to 754,971,000 bu. in 1939, and to the ten-year average of 754,685,000 bu. The U. S. carryover, as of July 1, 1940, was 284,000,000 bu. This makes a total U. S. supply for the year from July 1, 1940, to June 30, 1941, of 1,067,560,000 bushels.

In Canada, the 1940 wheat production is now placed at 561,104,000 bu. When the carryover from the preceding year is added to this, wheat supplies for the crop year beginning Aug. 1, 1940, are estimated at 834,191,000 bu., the largest in Canadian history.

Combining these two wheat supplies, the continent now has about 1,901,751,000 bu. of wheat on hand. As combined domestic requirements of the two countries are not expected to exceed 785,000,000 bu., there is a surplus for export and carryover of more than 1,100,000,000 bu., a record figure.

Crop Estimates Up

Increases in some important crops over the output estimates of Aug. 1 were indicated in the Department of Agriculture's Sept. 1 report, released on Sept. 10. This year's corn crop was estimated at 2,297,186,000 bu., compared to 2,248,246,000 bu. estimated on Aug. 1. For the same period, the wheat crop estimate advanced from 760,623,000 bu. to 783,560,000 bu.; oats from 1,121,619,000 bu. to 1,206,901,000 bu.; barley from 289,812,000 bu. to 304,955,000 bu.; and potatoes from 374,314,000 bu. to 383,172,000 bushels.

Among the minor grain crops, the revised estimates indicate rye at 37,452,000 bu., unchanged; buckwheat at 5,707,000 bu., down from 5,993,000 bu.; and rice at 52,280,000 bu., down from 55,071,000 bu. Dried bean output is expected to be 15,133,000 bags compared to 14,649,000 bags on Aug. 1. Peanut crop expectations fell off from 1,521,705,000 lb. to 1,511,150,000 lb. during the month and soybeans were unchanged at 85,509,000 bushels.

Expected crops of apples and peaches fell off slightly during the month, while estimated production of both pears and grapes increased slightly. Estimates for production of plums, prunes and apricots

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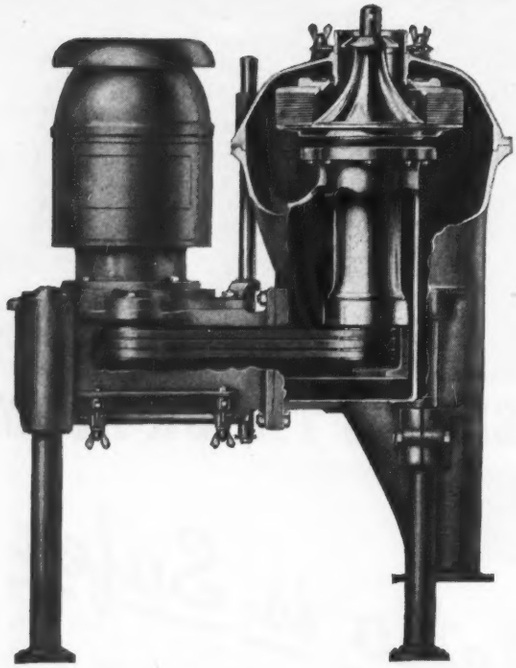

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Data for the Charts

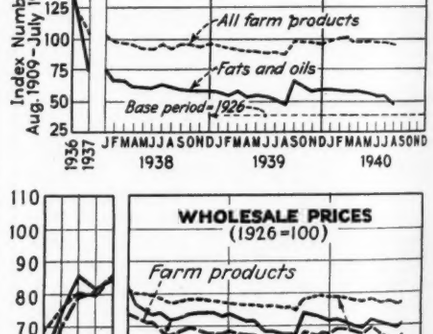
In preparing the curves shown on this and the succeeding page of FOOD INDUSTRIES, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week;* fats and oils index, Bureau of Raw Materials for American Vegetable Oils and Fats Industries.

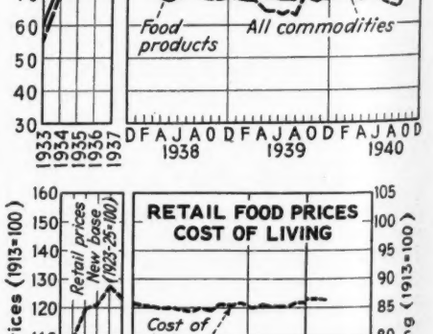
are also lower. The pecan yield is now expected to be 76,651,000 lb., compared to the 73,655,000 lb. estimate of the Aug. 1 forecast.

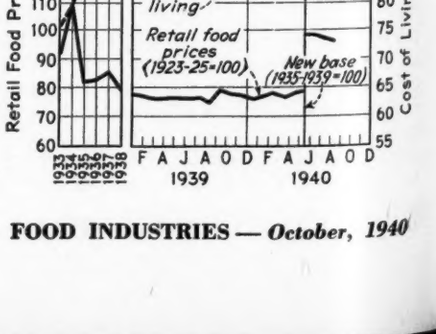
Vegetable crops are expected to be somewhat decreased because of unseasonably cold weather in the East and heavy rains and cold weather in the Middle West.

Commodity Prices Increase

Food commodity prices showed a definite increase in the four weeks from Aug. 17 to Sept. 14, rising from 66.2 to 68.2 according to the weekly index of the *N. Y. Journal of Commerce.* Rising employment and payrolls, largely stimu-


PRICE INDEX FOR FATS AND OILS
Index Number Aug. 1909-July 1914=100
All farm products
Fats and oils
Base period-1926
1936 1937 1938 1939 1940





lated by the United States defense program and British war orders, together with slightly increased food exports, are the most probable underlying causes of this increase.

During the same period, the general commodity price index of the *N. Y. Journal of Commerce* rose from 77.8 to 79.1, indicating a more rapid rise for food prices.

In the four week period (Aug. 17 to Sept. 14) many foods showed price increases. Wheat, No. 2 dark winter, rose from 64½c. to 73c. Flour increased from $4.25 to $4.70. Corn was steady. Oats, No. 2 white, rose from 28¾c. to 31½c., while rye increased from 56c. to 57c. Beef was unchanged, but pork loins fell from 19½c. to 17c. and lamb decreased from 20c. to 17½c. Lard rose from $5.40 to $5.45. Eggs upped from 17½c. to 21½c. Butter increased from 27c. to 27¾c., and cheese was unchanged. Coffee was steady, but cocoa rose from $4.22 to $4.52. Among the canned foods, tomatoes rose one cent to 55c., peaches increased from $1.10 to $1.12½, and salmon moved from $2.35 to $2.40.

INDICATORS

CONFECTIONERY and competitive chocolate products sales in July, 1940, were $14,378,000 for the 227 manufacturers reporting to the U. S. Department of Commerce, an increase of 21 percent over July, 1939, sales of the identical firms.

FLOUR PRODUCTION in August, 1940, according to *The Northwestern Miller*, by mills accounting for 64 percent of total United States production, was 5,873,982 bbl., compared to 6,127,592 bbl. in August, 1939.

CLING PEACH PACK in California this year is estimated to have been 9,740,000 cases.

GREEN AND WAX BEAN production for canning and freezing in 1940 is now estimated at 97,300 tons, compared to 94,150 tons last year.

SWEET CORN for canning and freezing in 1940 is estimated at 704,300 tons, compared to 661,100 tons a year previous.

TOMATO PRODUCTION for canning in 1940 is estimated at 1,811,300 tons, compared to 1,996,800 tons in 1939.

PEAS canned in 1940 totaled 25,418,484 cases, compared to 16,327,772 cases in 1939.

SOUR CHERRY PRODUCTION in the U. S. in 1940 was 100,090 tons, almost exactly equal to the 1939 record production of 101,110 tons.

GREEN LIMA BEAN PRODUCTION for canning in 1940 is estimated at 25,320 tons, compared to 29,700 tons a year before.

CANNED SALMON export shipments in July, 1940, were 11,941,000 lb., compared to 670,000 lb. exported in July, 1939.

FISHERY PRODUCTS, frozen, in cold storage on August 15, 1940, were 76,496,085 lb., 5 percent more than on the same date a year ago.

DRY SKIM MILK production in July, 1940, was the largest recorded for the month and 20 percent above July, 1939, output.

EGG PRODUCTION in August, 1940, was the largest for the month since 1931 and amounted to 8,111,000 cases, compared to 7,825,000 cases in August, 1939.

CREAMERY BUTTER production in July, 1940, was estimated by the Agricultural Marketing Service at 183,545,000 lb., an increase of 2 percent over July, 1939, production.

CHEESE, American, produced in July, 1940, was reported by the Agricultural Marketing Service at 67,485,000 lb., a record for the month and 10 percent above July, 1939.

EVAPORATED and condensed milk produced in July, 1940, was 267,458,000 lb.

SALES of oleomargarine in July, 1940, as indicated by sales of internal revenue stamps, totaled 22,800,696 lb., compared to 19,916,586 lb. in July, 1939.

CRANBERRY production in 1940 is expected to be only about 70 percent of the 1939 output.

FRUITS, frozen, in storage on Sept. 1, 1940, totaled 163,043,000 lb., compared to 143,057,000 lb. on Sept. 1, 1939, and to a 1935-1939 average of 119,074,000 lb. for the date.

VEGETABLES, frozen, in storage on Sept. 1, 1940, amounted to 76,813,000 lb., compared to 71,639,000 lb. a year earlier.

BUTTER, creamery, in storage on Sept. 1, 1940, was 134,476,000 lb., compared to 172,825,000 lb. a year before and to a 1935-1939 average of 155,585,000 lb. for the date.

CHEESE, all kinds, in storage on Sept. 1 of this year was 148,097,000 lb. against 125,019,000 lb. for the same date last year, and an average of 122,262,000 lb. for the date in 1935-1939.

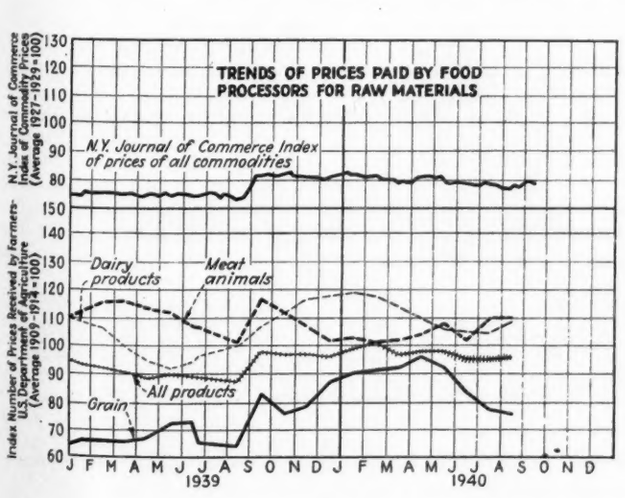
EGGS, case equivalent, in storage on Sept. 1, 1940, totaled 11,404,000 cases, compared to 10,482,000 cases on Sept. 1, 1939, and to an average for the date in 1935-1939 of 10,733,000 cases.

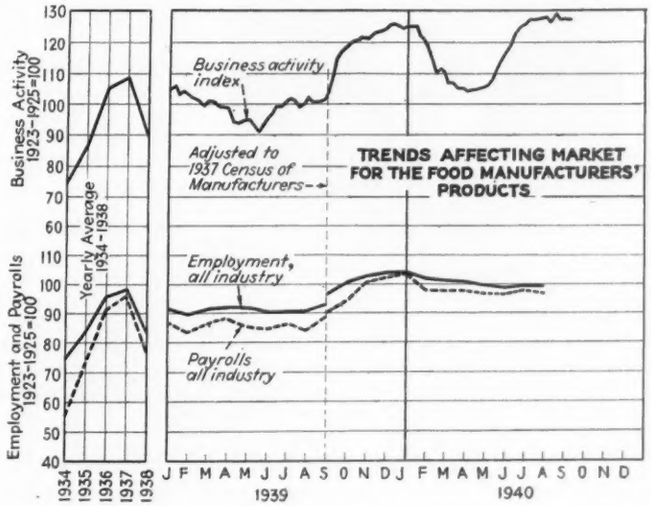
POULTRY, all kinds, in frozen storage, Sept. 1, 1940, amounted to 82,137,000 lb. A year before the quantity was 62,870,000 lb., and the Sept. 1 average in 1935-1939 was 56,389,000 pounds.

MEAT, all kinds, in cure and storage, totaled 523,762,000 lb. on Sept. 1 of this year. A year ago the figure was 462,403,000 lb. and the average figure for Sept. 1 in the years 1935-1939 was 468,548,000 pounds.

LARD in storage, Sept. 1, 1940, was 272,887,000 lb., compared to 110,378,000 lb. a year previous and to an average in 1935-1939 of 101,838,000 lb. for the date.

WEEKLY WHOLESALE FOOD PRICE INDEX of Dun & Bradstreet stood at $2.31 in the week ending Sept. 14, 1940, compared to $2.46 for the corresponding week last year.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Dairy products
Meat animals
All products
Grain
J F M A M J J A S O N D J F M A M J J A S O N D
1939
1940


Business Activity 1923-1925=100
Yearly Average 1934-1938
Employment and Payrolls 1923-1925=100
1934 1935 1936 1937 1938
Business activity index
Adjusted to 1937 Census of Manufacturers
TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Employment, all industry
Payrolls all industry
J F M A M J J A S O N D J F M A M J J A S O N D
1939
1940

Men, Jobs & Companies

INDUSTRY

Austin Packing Co., Inc., Baltimore, has moved into a new plant which is said to be the most outstanding plant of its kind for the manufacture of peanut butter sandwiches.

Banfield Frozen Foods, Inc., has opened a new locker and packing plant at Sapula, Okla. It has two plants at Tulsa.

Cudahy Packing Co., Chicago, is constructing a freezer building at its Newport, Minn., plant for the freezing and storing of fresh meats. Refrigeration equipment will include 65,000 ft. of 2-in. ammonia coils.

Kraft Cheese Co., Chicago, is remodeling its plant at Fayetteville, Tenn., and is adding a new building with approximately 1,400 sq.ft. of floor space.

Kurth Malting Co. is increasing storage capacity at its Milwaukee and Minneapolis plants by 1,000,000 bu.

Milton (Fla.) Ice & Cold Storage Co. is building a canning plant which will specialize in the canning of white potatoes.

BROOKS MORGAN

He will handle the Southeastern operations of J. B. Carr Biscuit Co., Wilkes-Barre, Pa., with headquarters at the Greenwood, S. C., factory. Mr. Morgan was at one time president of the former Frank E. Block Co., the South's largest and oldest confectionery industry. From 1917 to 1927 he served as president of Biscuit and Cracker Manufacturers' Association of America.

P. J. McKENNEY

C. C. HINE

Pillsbury Flour Mills Co., Minneapolis, has appointed Mr. McKenney as president of its new Globe Mills division. He first started with Pillsbury in 1917 and at the time of his promotion he was vice-president in charge of Pacific Coast activities. Mr. Hine, who was vice-president of the former Globe Grain & Milling Co. before it was bought by Pillsbury, has been named vice-president and general manager of the Globe Mills division.

National Poultry & Egg Board, patterned after the National Livestock & Meat Board, has opened offices in Chicago and will conduct an educational campaign. Herman C. Demme, Sewell, N. J., has been named president.

Nebraska Consolidated Mills, Omaha, will construct its first flour mill outside of the state at Decatur, Ala. The Decatur mill will have a daily capacity of 800 bbl. of flour, an elevator grain storage for 350,000 bu., and will cost somewhere from $250,000 to $500,00. Harry Glade will manage the new plant.

Nehi Corp., Columbus, Ga., has started suit in the Chancery Court of Delaware against Coca-Cola Co., Atlanta, in regard to the use of the word "Cola." Each company is a Deleware corporation.

Nootka-Banfield Packing Co. is constructing a herring cannery at Ucluelet, B. C. Some of the herring will be prepared with tomato sauce.

Pepperidge Farm, Fairfield, Conn., is erecting a modern bakery at Norwalk for the manufacture of its bread, which retails at 25 cents a loaf.

Pratt-Low Preserving Co., Santa Clara, Calif., has added quick frozen vegetables to the list of products that it packs.

Ralston Purina Co., St. Louis, will build a mill and warehouse at Omaha, to cost about $100,000.

Richter's Bakery, San Antonio, Tex., is building a new bread baking plant, 350x250 ft., to cost about $350,000 with complete new equipment. Its present plant will be converted into a bakery for Colonial Cake Co. which it also operates.

Seven-Up Bottling Co., Joliet, Ill., is constructing a $250,000 plant.

Texas Chemurgic Industries, Inc., recently organized at Dallas, will have a daily plant capacity of 100 to 150 tons of sweet potatoes which will be processed. William C. Witt, president, has indicated plans for converting sweet potatoes into stock feed, a yam flour which is said to be in demand with bakers and housewives, and sweet potato starch.

United Biscuit Co. of America, Chicago, plans to use $800,000, to be realized from a proposed offering of a new preferred stock issue, for building and equipping a new plant at Westover, Ohio.

IT PAYS TO BE SCOTCH . . .

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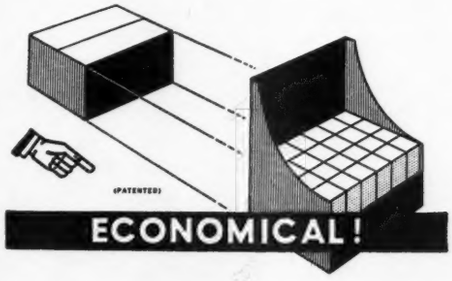

Better See H & D

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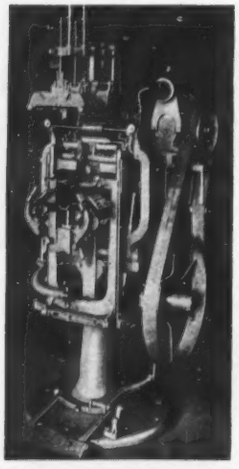
The BEST Labelers in the WORLD for YOU

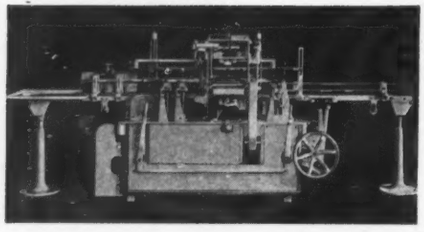
If yours looks to be a labeling headache (a flock of different size containers or labels and maybe some neck labels and foil as well as body labels) the Model S Improved WORLD Labeler is the one best prescription. It handles any or all of 'em, short runs or long, and does it with economy, precision and despatch.

If it's high production you're after the Model HS WORLD Automatic Straightaway Labeler is the answer. It keeps up with your procession of flat, square, round, oval or panel flasks, fifths or quarts; the Model HG for half-gallon and gallon bottles and jugs.



Left: The Model S Improved WORLD Labeler. Bulletin S-8 gives you the whole story on this super-flexible, semi-automatic labeler. Write for it.

Below: The Model HS WORLD Automatic Straightaway Labeler. Bulletin HS-8 contains complete information. Let us mail it to you.



Send for Bulletins or, better still, send us samples of your containers and labels so we can give you all the facts and figures.

ECONOMIC MACHINERY CO.

WORCESTER, MASSACHUSETTS

BROOKS F. SMITH

Standard Brands, Inc., New York, has appointed him New England division manager. He has been manager of the public relations department which was organized early this year.

Wisconsin Cranberry Sales Co., which handles about 90 percent of the Wisconsin cranberry crop, has joined Cranberry Canners, Inc., South Hanson, Mass., a growers' cooperative. The cooperative will now represent growers producing about 85 percent of the national crop. A canning plant, to handle the Wisconsin crop, will be located in the vicinity of Chicago.

PERSONNEL

Theodore Carl, chief chemist for Taylor Wine Co., Rheims, N. Y., has resigned to accept a position with Urbana Wine Co., Hammondsport, N. Y.

G. S. Childs, executive vice-president of Michigan Sugar Co., Saginaw, has become president to succeed E. C. Bostock, who has been made chairman of the board.

George A. Eastwood, president of Armour & Co., Chicago, and F. H. Kullman, Jr., of Bowman Dairy Co., Chicago, have been appointed to the agriculture committee of the Chamber of Commerce of the United States.

John Fisher, Boaz, Wis., has been elected president of Southwestern Wisconsin Cheesemakers' Association.

C. J. Henderson, treasurer of Hawaiian Pineapple Co., Ltd., Honolulu, has been made a vice-president.

Marvin Johnson has been appointed Chicago district manager of Rumford (R. I.) Chemical Works. Walter Pfluger was named New York district manager, and E. R. Baumert, district sales manager at Dallas, Tex.

Duncan Keppy has been named manager of the Niagara Falls, Ont., plant of Shredded Wheat Co. He succeeds H. Wallace, who has been moved to Niagara Falls, N. Y., to manage the Erie Ave. plant.

Glenn Neal, formerly production technologist in the baking division of Zion (Ill.) Industries, is now production foreman with Veltman Cookie Co., Grand Rapids, Mich.

Dr. H. C. Olson, assistant professor of dairy manufacturing at Iowa State College, has become head of the department of dairy manufacturing at Oklahoma A. & M. College, Stillwater. He succeeds Dr. J. I. Keith who has become head of the new department of food engineering in the school of engineering.

Paul A. Roegge has been elected president of Lippincott Co., Cincinnati. He is a nephew of the former president, William Roegge, who died several months ago.

Edward J. Rooney has been appointed district manager of the Chicago territory of Swift & Co., Inc., Chicago. He succeeds Albert M. Kuehne, who is now with the sales administrative staff.

Emil Schierholz, general manager of Narragansett Brewing Co., Cranston, R. I., has been elected president to succeed the late Herbert L. Moeller.

Daniel J. Treacy has been named brewmaster for Brockert Brewing Co., Worcester, Mass. He has held similar positions with Frank Jones Brewing Co., Portsmouth, N. H., Silver Spring Brewing Co., Sherbrooke, Que., and Walters Brewing Co., Trinidad.

Clark M. Van Paris has succeeded the late Thomas W. Taliaferro as president and general manager of Hammond, Standish & Co., Detroit.

Bruno J. Verbeck, formerly baking technologist with Technical Institute of Independent Biscuit Manufacturers Co., Chicago, has joined the Wilson & Co. bakery research laboratory staff.

C. D. BRADLEY

National Biscuit Co., New York, has made him manager of the bread department. He has been district sales manager in Cincinnati.

DEATHS

Albert Stacy Beakes, 84, prominent in the New York milk industry for the past 60 years, Aug. 29, at New York. He founded A. S. Beakes & Co., which was later taken over by Dairymen's League Cooperative Association.

Henry A. Dupiech, 72, president of J. M. Dupiech Bottling Co., St. Louis, Sept. 4. He was one of the founders and former president of Missouri Bottlers Association.

Arthur Montgomery, 86, one of the organizers and president of Atlanta (Ga.) Coca-Cola Bottling Co., Sept. 5. This firm received one of the first bottling franchises to be issued by the original firm.

Col. J. W. Neal, at one time associated in the firm of Cheek & Neal, manufacturers of "Maxwell House" coffee, Aug. 31, at Houston, Tex.

William M. Steele, 73, vice-president of John F. Jelke Co., Chicago, and formerly head of the oleomargarine department of Glidden Co., Aug. 24, at River Forest, Ill.

George S. Ward, 73, long prominent in the baking industry and one of the co-founders and former president of Ward Baking Co., recently, at Havana.

ASSOCIATED INDUSTRIES

American Council of Commercial Laboratories, which serves as a clearing house for scientific and testing research information, has appointed A. J. Nydick, New York, executive secretary.

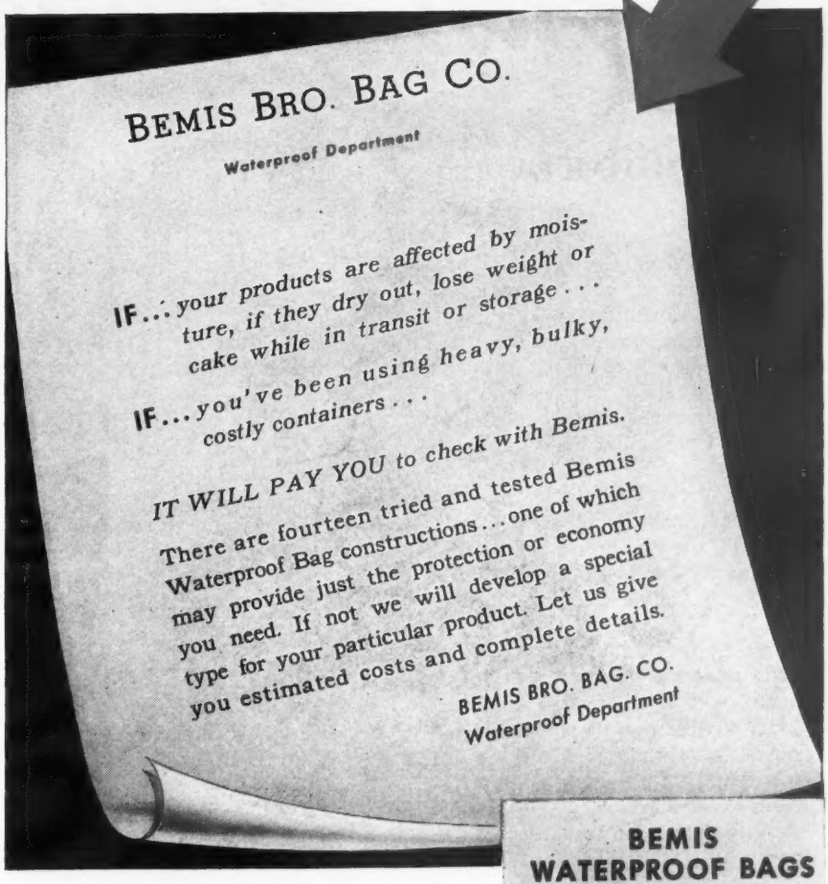
Continental Can Co., Inc., New York, intends to spend $25,000,000 over the next three years on an expansion and betterment program, to be based on information secured by the company's directors and management officials on periodic visits to the various company plants.

Industrial Paint Clinic has been organized in Chicago as a consultation service on industrial maintenance paint problems.

Leeds & Northrup Co., Philadelphia, has appointed W. Richison Schofield, director of engineering, and John W. Harsch, chief engineer.

National Resources Planning Board has named David L. Fiske, executive secretary of American Society of Refrigerating Engineers, to a special committee which will prepare a national roster of scientific and specialized personnel for use in national emergency. Crosby Field, president of Flakice Corp., is another member of this committee.

An important message to makers of DRY FOOD PRODUCTS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IF... you've been using heavy, bulky, costly containers...
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There are fourteen tried and tested Bemis Waterproof Bag constructions... one of which may provide just the protection or economy you need. If not we will develop a special type for your particular product. Let us give you estimated costs and complete details.
BEMIS BRO. BAG. CO.
Waterproof Department

If you have a troublesome shipping problem . . . the Bemis Shipping Research Laboratory is at your service

Scores of tough shipping problems have been solved for makers of dry food products in the Bemis Shipping Research Laboratory. Here, with specially designed equipment, Bemis research men determine just which types of materials and constructions should be used to make sure your customers receive all the quality you put into your products. Safety, practicability, appearance, economy . . . every feature for assuring you increased shipping efficiency is given thorough consideration.

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Just off the Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

CLEANING EQUIPMENT—The use of the "Hypressure Jenny" for cleaning and maintenance is discussed in a bulletin entitled "Make 25 Percent Extra Profit" published by Homestead Valve Mfg. Co., Coraopolis, Pa.

DUST CONTROL—Modern dust collecting equipment is illustrated and briefly described, together with a list of prominent users, in a recent bulletin issued by Pangborn Corp., Hagerstown, Md.

FOOD PLANT EQUIPMENT—In Catalog No. 60, a 256-page illustrated catalog, a wide line of equipment for bakeries, restaurants, institutions, ice cream manufacturers and others, including ovens, machinery and utensils, is described and illustrated by H. A. Johnson Co., 221 State St., Boston, Mass.

FOOD PROCESSING EQUIPMENT — Grinding, mixing, screening, feeding and other processing equipment for food plant service, with illustrations and specifications are the subject of an 84-page process equipment catalog published by Prater Pulverizer Co., 1811 S. 55th Ave., Chicago, Ill.

REFRIGERATION EQUIPMENT—Pipe coils for use in refrigeration work are the subject of Bulletin 156-B of Frick Co., Waynesboro, Pa.

Plant Accessories and Supplies

COMBUSTION CONTROL — Automatic combustion control for all sizes of boilers, for all types of fuel firing, and for all load conditions, are described in a series of bulletins issued as Data Book No. S-21 by Republic Flowmeters Co., 2240 Diversey Parkway, Chicago, Ill.

DIESEL ENGINES—Types 8 and 9 diesel engines for continuous heavy-duty stationary service, in sizes from 60 to 400 hp. are described and illustrated in Bulletin 768—second edition—published by Chicago Pneumatic Tool Co., 6 East 44th St., New York City.

GENERATORS—Direct current generators and exciters, Type B, general purpose, 125 or 250 volts, ¾ to 10 kw., are the subject of Bulletin GEA-1607C, General Electric Co., Schenectady, N. Y.

FANS—"Truflo" ventilating fans of wall types are described with specifications, in Bulletin 240 of Truflo Fan Co., Harmony, Pa.

FROZEN FOOD PACKAGE—In Bulletin L-1, entitled "Cry-O-Vac Protection" the use of latex rubber bags for frozen foods in the locker plant is discussed by Dewey & Almy Chemical Co., Cambridge, Mass.

LOCK NUTS—"Elastic Stop" self-locking nuts of many types are described with application information in Folder L40-10 of Elastic Stop Nut Corp., 2330 Vauxhall Road, Union, N. J.

LUBRICATION—Lubricants for the dairy industry and the importance of proper lubrication in the canning industry are the subjects of two recent bulletins published by Fiske Bros. Refining Co., Newark, N. J.

POWER TRANSMISSION EQUIPMENT —Catalog No. 53, a 290-page illustrated pocket-size catalog describes the line of gears, chains and other power transmission accessories, manufactured by Boston Gear Works, Inc., North Quincy, Mass.

RUBBER PRODUCTS—Belting, hose, gaskets, packing and other mechanical rubber products are described in a 24-page illustrated catalog of B. F. Goodrich Co., Akron, Ohio.

VALVES—Complete dimensions of all types of valves in the Hancock valve line, together with complete material specifications of metals used in the valves, are given in 40-page Bulletin No. 5-7000 issued by Hancock Valve Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

VALVES—"Stabilflo" valves for use in process control are the subject of folder DMF789 of The Foxboro Co., Foxboro, Mass.

VALVES—Various types of valves for many industrial uses are described briefly in a recent folder entitled "They're a Better Buy By the Year" issued by Homestead Valve Mfg. Co., Coraopolis, Pa.

VALVES AND FITTINGS—A new general catalog illustrating and describing a complete line of steel valves and fittings in 306 pages, known as catalog No. 40-F, has been issued by Crane Co., 836 S. Michigan Ave., Chicago, Ill.

Control Equipment

CONTROL EQUIPMENT — Thermocouples, thermocouple wire, lead wire, insulators and protecting tubes are among the control instrument accessories listed in Bulletin No. 52-2, issued by Wheelco Instruments Co., 1929 S. Halsted St., Chicago, Ill.

CONTROL EQUIPMENT—Vacuum tube, time-delay relays for controlling processing equipment are described in Bulletin GEA-2902B, issued by General Electric Co., Schenectady, N. Y.

pH EQUIPMENT—Electron-ray pH meters and thermionic pH recorders are described in Bulletins 910E and 910T, respectively, by Cambridge Instrument Co., Inc., 3732 Grand Central Terminal, New York, N. Y.

pH CONTROL—The "Industrial" pH tester, a small portable electric pH testing outfit, is the subject of a recent bulletin published by Wilkens-Anderson Co., Chicago, Ill.

TEMPERATURE CONTROL INSTRUMENTS—A line of thermometer and pyrometer controllers for gas, electric and oil-fired ovens, is described in Bulletin 548, published by The Bristol Co., Waterbury, Conn.

An Effective Defense Against Excessive Costs

Excessive production and maintenance expenses have no place on the cost sheets of industry today. Yet using out of date, misfit motors on your equipment often results in unnecessary costs that penalize production efficiency and profits.

Modern engineering, particularly in the machine tool field, requires the selection of an electric motor having starting and operating speed and torque characteristics that accurately match the load requirements of the driven machine and the surroundings in which it must operate. Century Motors are designed to properly fit the load requirements of the machines they drive — to contribute to maximum production, and improved performance, at the lowest cost. Call in the Century Motor Specialist nearest your office. He's trained to analyze your motor problems. Century offers you and your engineers the widest selection of motor types and sizes, from fractional to 600 horsepower.

Industry has found that Century Motors, properly selected and applied, are a vital factor in keeping production moving smoothly and holding costs at a minimum.

For 37 years the Century organization has worked closely with American industry. Its experience and that of its national field organization is always at your service.

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Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

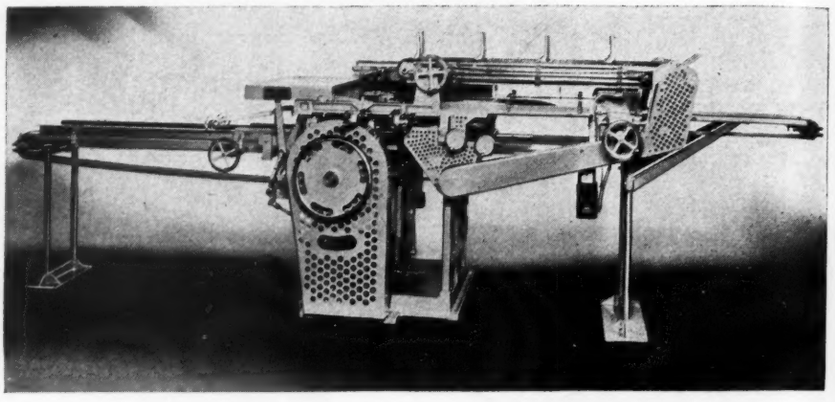
Pliofilm Wrapping Machine

PACKAGE MACHINERY CO., Springfield, Mass., has announced machines for wrapping packages in Pliofilm. One of these is a machine for overwrapping four-sided trays of chewing gum packages.

The manufacturer points out that requirements for applying Pliofilm are different from those used with other transparent wrapping material. Precise temperature control and special folding mechanism are necessary. The application of heat causes the material to be welded to itself instead of just sealed as in the case of other transparent wrappers. This results in a better seal than could be otherwise produced.

Because of this type of seal, an easy opening tape is necessary to facilitate opening of the packages. This tape is applied automatically by the wrapping machine.

To solve these problems, a modification of Packing Machinery Company's standard FA type of wrapping machines has been made. In the machine shown, speeds up to approximately 100 packages per minute are available, depending upon the nature and size of the package being wrapped.

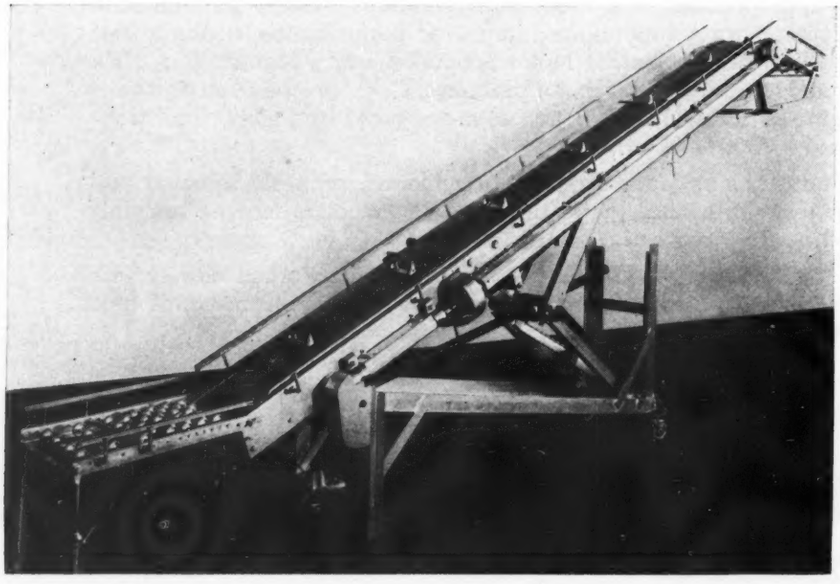


Machine for wrapping packages in Pliofilm.

Case Stacker

A PORTABLE CONVEYOR for stacking and unstacking cases of canned goods in warehouse operations has been developed by Chisholm-Ryder Co., Niagara Falls, N. Y. This stacker is available in three lengths of boom—14, 16 and 18 ft.—which models will respectively stack levels of 10, 11 ft. 9 and 13 ft. 6 in. The machines are designed for handling standard sized wooden boxes, paper cartons, crates and bags. They consist of a belt conveyor, equipped with lugs for holding the cases and operating over rollers supported on an anti-friction steel bed. Feed and discharge sections are of the wheel conveyor type.

The stacker is so designed that the upper end can be lowered or raised to discharge or receive at various levels. It is mounted on rubber-tired casters and equipped with a ½ hp. single phase motor and pushbutton control.



Stacker for boxes, cartons, crates and bags.

Automatic Reset Timer

R. W. CRAMER CO., INC., Centerbrook, Conn., has brought out the RS automatic reset timer for the automatic accurate timing of electrical circuits. The device consists of an inclosed snap action switch unit which is actuated by an operating arm driven in one direction by a small synchronous motor with an inclosed magnetically operated gear clutch and a spring resetting means to the starting position after the time cycle has been completed. Time settings are adjustable by setting the pointer on the unit to the desired time scale. Several time ranges are available to meet various timing requirements. The contact has a capacity of 10 amp. at 115 volts or 5 amp. at 230 volts. The instrument can be furnished for flush panel mounting or in a dustproof case suitable for BX or conduit wiring.

Salt Tablet Dispenser

A SALT TABLET DISPENSER made of specially plated aluminum, has been

Look, C. B...

PATAPAR REALLY IS *Insoluble*

"Huh", replied C. B., "we should have known about that long ago . . . It's just what we need."

Moisture was at the root of the problem. So, the young executive took a sheet of Patapar Vegetable Parchment and soaked it in water for a week. It seemed hardly credible that any paper could stand such punishment without going to pieces. But Patapar really IS insoluble!

Patapar is also grease-resisting, and odorless. It is made in many sizes, weights, and special finishes—sheets and rolls. If it suggests an answer to a problem of yours, tell us what you have in mind, and we'll send samples and full information.

Patapar
Reg. U. S. Pat. Off. & Foreign Countries
Vegetable Parchment

PATERSON PARCHMENT PAPER COMPANY

Bristol, Pennsylvania

West Coast Plant: 340 Bryant Street, San Francisco, California

Branch Offices: 120 Broadway, New York, N. Y. 111 West Washington Street, Chicago, Ill.

brought out by Milburn Co., 905 Henry St., Detroit, under the name of "Dispens-Eze". This is for the purpose of dispensing ten or fifteen grain salt tablets for use by workers in hot atmospheres and other places where the taking of salt is necessary to workers' comfort. The dispenser is of heavy construction and is provided with a Yale lock which serves the double purpose of safeguarding the contents and locking the dispenser to the wall bracket. The material of which it is constructed and the fact that it is made as near moistureproof as possible eliminates any corrosion difficulties in connection with the storing and dispensing of the salt. It is designed for dispensing one tablet at a time by means of the operation of a hand lever.

Floodlight

WESTINGHOUSE ELECTRIC & MFG. Co., Lighting Division, Edgewater Park, Cleveland, Ohio, has brought out a low-priced floodlight in a light-weight weatherproof model. This light has a one-piece reflector of etched aluminum to which is attached an extruded aluminum socket housing. The lense is held in place by a metal retainer ringer. This assembly is mounted on a cast aluminum mounting bracket which allows horizontal adjustment through 360 deg. and vertical adjustment through 135 degrees.

The light is available in 8 in. diameter for a 100-watt lamp or 10 in. diameter for a 200-watt lamp. Both sizes can be had with either plain or spread beam light distribution, and with plain or colored lenses.

Stereoscopic Microscopes

SPENCER LENS Co., Buffalo, N. Y., has brought out new types of stereoscopic microscopes in four different mechanical arrangements to cover a wide range of uses. Magnification range from 6.3X to 144X. Seven different powers in paired objectives and four different powers in paired eyepieces provide a total of 28 different magnifications.

Features of the new instruments, according to the manufacturer, are improved design which facilitates focusing on large or small specimens and provision for quick changes in magnification. The angle between the axes of the two elements of the paired objectives is 12 degrees. In the prism boxes, each line of light is bent 2 deg. towards the center, so that the convergence of the eyepieces is but 8 degrees. It is said that this dual convergence maintains the stereoscopic effect, but makes it possible for the operator to work more comfortably for long periods without eye strain.

Electronic Level Control

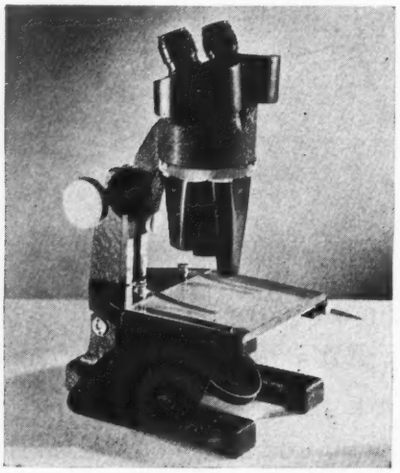
PHOTOSWITCH, INC., 21 Chestnut Street, Cambridge, Mass., has developed an electronic liquid level control for the automatic control of the level of liquid without the use of float switches. This control is activated by a pair of probes that are placed in the liquid at the level where control is desired. When the level of the liquid reaches this point, sufficient current passes through the liquid to actuate the pilot relay. The electrical resistance between the probes may be as high as 25 megohms. The maximum current passing through the actuating circuit of the pilot relay is three-millionths of one ampere. The relay can be used to operate a solenoid valve, pump or other equipment for the purpose of maintaining a constant level. The manufacturers recommend this level control particularly for use in connection with corrosive liquids, or similar materials.

Truck Weigher

FAIRBANKS, MORSE & Co., 600 So. Michigan Ave., Chicago, has brought out a full capacity scale beam which is said to make the weighing of motor trucks more accurate, faster and easier. With this beam, all graduated face plates are set at an angle of 45 deg., permitting a tall or short person to read the scales from a natural standing position. The plates are made of aluminum and have large black etched figures, in order to reduce eyestrain.

All poises are center indicating, of the open face type which do not cover nor obstruct the graduated face plates. The main poise and the main tare poise have stainless steel roller bearings which run on a machined track for easy and fast operation. Both of these poises are also equipped with positive seating stainless steel poise dogs located in the center and operating in a vertical plane from side handles. These poise dogs engage in 90 deg. notches which are machined

Aluminum salt dispenser.



New type stereoscopic microscope.

General purpose floodlight.

Electronic liquid level control.

on the under side of the beam so that dirt cannot accumulate in them, and affect the accuracy of the setting.

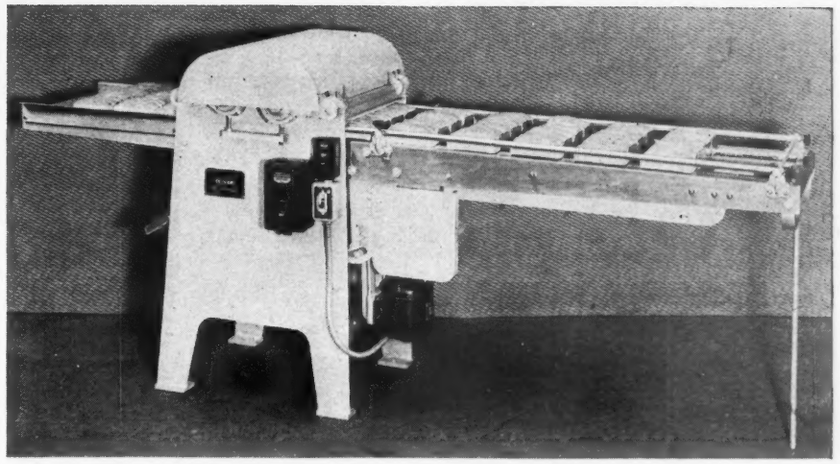
This new beam is available with or without tare bar. Working parts are heat-treated to insure precision fit and continued accuracy. The entire beam except the aluminum face plate is finished in slate gray crackel enamel.

Roll Slitter and Slicer

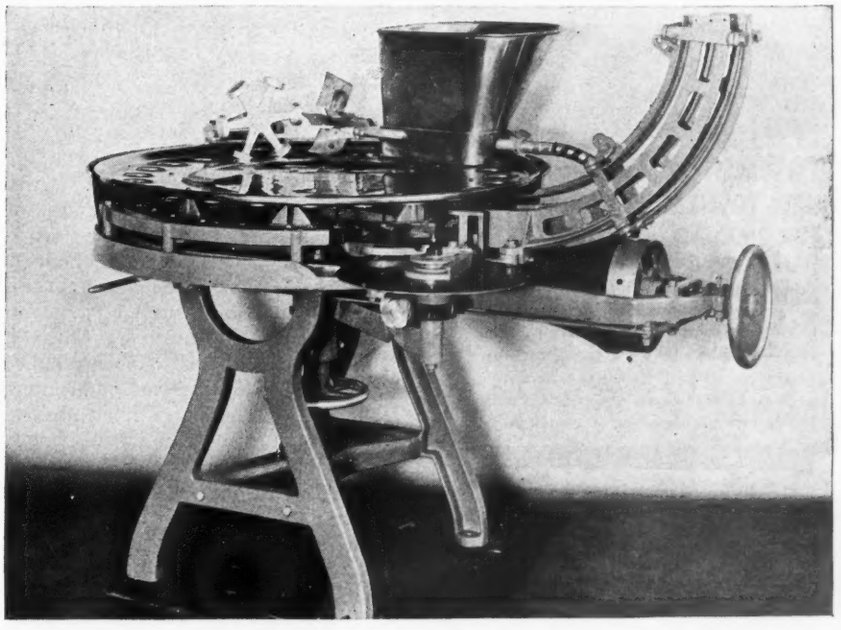
OLIVER MACHINERY Co., Grand Rapids, Mich., has brought out the No. 788 frankfurter roll slitting and slicing machine. This machine has an automatic flight infeed arranged to handle pan-baked frankfurter roll mats, approximately 16¾ in. long, 5½ in. wide and about 1¾ in. thick. This infeed operates at the rate of approximately 10, 13 and 16 flights per minute. The machine has two ball bearing arbors, the first of which follows immediately the flight infeed and has 13 rotary disks, three of which, the two outside and the center, are 8 in. diameter disks for the purpose of trimming superfluous material from the end and separating the batch into two lots of 6 rolls each. The remaining ten disks are 7 in. in diameter spaced at about 1⅜ in. and act as slicing units. Adjustments permit these ten disks to either slice all the way through or to slice within any distance from the bottom up to ½ in.

The second arbor carries 12 disks of 7 in. diameter spaced approximately 1⅜ in. from each other for the purpose of making central openings in the rolls for insertion of the frankfurter.

The outfeed table is of stainless steel and of sufficient length to receive the rolls in sequence of 12 each at the discharge end. A ¾-hp. motor drives the unit through a V-belt and a second motor of ⅛ hp. drives the infeed mechanism through a gear reduction.



Slitting and slicing machine for frankfurter rolls.



Vegetable and fruit filling machine.

Fruits and Vegetable Filler

CHISHOLM-RYDER Co., Niagara Falls, N. Y., is marketing a new design of the "CRCO" vegetable and fruit filler, for automatically filling cans. As can be seen from the accompanying illustration, this filler is provided with a hopper to hold the material being filled and also is provided with a recessed stainless steel bowl top which can be used to hold products filled into the can by hand. The product passes directly through the filler hopper and into the cans, which are carried around the machine in the pockets of a circular wheel as shown. When used for hopper filling, the central bowl is suitable for carrying some of the products to be filled into top of can to give each can a uniform fill.

It is stated that with this filler such products as tomatoes, peas, stringbeans, cherries, berries, etc., can be practically automatically filled but with hand-pack quality.

Meat Aging Cabinet

THE AGRICULTURAL ENGINEERING DEVELOPMENT DIVISION OF THE COMMERCE DEPARTMENT OF THE TENNESSEE VALLEY AUTHORITY has developed an electrical meat aging cabinet for use in the improvement of quality of country-cured ham. In announcing this development, the division states that it is generally recognized that when country salt-sugar cured hams have been aged for from 1 to 3 years, they develop a characteristic desirable flavor, not found in freshly salted hams. The cabinet is for the purpose of producing the same results through a comparatively short aging period.

While this development was for the use of farmers in connection with community refrigerators, it is suggestive of methods that could be used on a larger scale. The cabinet is an insulated, electrically-heated cabinet of the box-type with top opening. In it a 200-watt light bulb set in a flue, regulated by a thermostat, supplies a uniform distribution of heat. Arrangement is made to maintain the temperature in the cabinet at about 110 deg. F., and the hams are left in this temperature for a period of about seven weeks. The model is 28½ by 48 in. and 37½ in. high. It has a capacity of 14 to 18 hams, depending upon their size.

In operation, hams are used of from 15 to 20 lb. in weight, trimmed and shaped. These are salt or sugar-cured

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NEW LOW-PRICED LIFT TRUCK
FOR 1000 TO 3000-LB. LOADS

It's here! A thrifty, new lightweight Towmotor that cuts handling costs to a new low. Scoops up bags, barrels, boxes, cans—1000 to 3000 lbs. at a clip—whisks them anywhere you say—up to 10 m.p.h. Stacks loads as high as 11 feet in 16½ seconds. Costs less to operate than you pay a trucker.

SAFER, MORE COMFORTABLE
For the Driver

Less tiring, better vision, no danger of being bumped—thanks to Seated Center Control and full-width upholstered seat.

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LOWEST COST PER TON HANDLED

Moves more tons per day at less cost per ton because it's built *speedier, tougher, more accessible* than any other machine in its class. Powered for peak capacity 24 hours a day—2 speeds forward and *2 reverse*—with smooth, fast-acting hydraulic lift.

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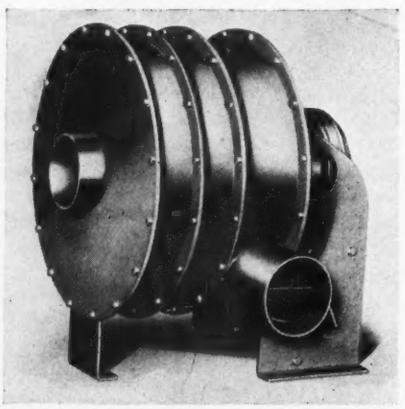
according to an approved formula, at a temperature of 35 to 40 deg. F., for a time of 3 to 4 weeks. The hams, when taken out of the salt cure, are wiped thoroughly and then allowed to hang for a couple of days to dry in a protected room that is free from flies. The hams may be smoked or not as desired. A smoking period of from 3 to 6 days, depending on the desired flavor, is recommended with the use of corncob or hickory chips as a smoke medium.

After this treatment, the hams are hung in electric aging cabinets in such a way that they do not touch each other or the cabinet at any point. After hanging the hams in the cabinet, the electric current is turned on and two or three days are taken to gradually bring the temperature up to 110 deg. F. This is accomplished by adjusting the thermostat. After a constant temperature of 110 deg. F. is obtained, the procedure is to alternately disconnect and connect the electric current at 12-hour intervals for the next two or three days. After the first week, the temperature is maintained constantly at 110 deg. F. for six weeks more, or until such time as the desired flavor has been obtained. If the hams show a tendency to puff under their "skin" surfaces, particularly during the first ten days, it indicates that the heat is being applied too rapidly. In this event, the current should be disconnected intermittently for a few more days. If the "puffing" condition continues to any appreciable degree, there is indication that the hams were not properly salt-cured before placing them in the cabinet.

Operators of electric aging cabinets made after the above design are reporting favorable results in aging bacon, sausage and other meats as well as hams.

Motor Blower

INGERSOLL-RAND Co., 11 Broadway, New York, N. Y., has introduced the Type G motor blower, suited for furnishing air for general industrial uses. This blower is built in 72 sizes with pressures from ½ to 2¼ lb. and volume from 100 to 4,500 cu.ft. per min. Discharge openings on all sizes can be located in any one of eight positions in steps of 45 deg. The motor blower is designed for maintenance of constant pressure over the entire volume range and is said to be particularly advantageous in furnishing combustion air for oil- or gas-fired furnaces. The blower characteristics are such that the power consumption varies approximately in proportion to the volume of air delivered.



Motor blower for general industrial purposes.

Truck Washer

KELITE PRODUCTS, INC., 909 E. 60th St., Los Angeles, Calif., has brought out the Kelite car washer suitable for washing trucks used in the food field. This washer uses a special cleaning preparation known as "Auto Shampoo", which is mixed with air and water in the machine and forced under pressure through an atomizing nozzle forming a spray which is directed by the operator onto the surface that is being cleaned.

Cleaner for truck.

The cleaning agent is said to be of a nature such that it penetrates beneath the surface of oil, grease, road grime and other forms of foreign matter, soaks it free from the painted surface and carries it away in the suds formed by the machine. In cases of extremely dirty surfaces, it is said that a light rubbing with a wool mit while the foam is still on the surface will effectively clean the finish.

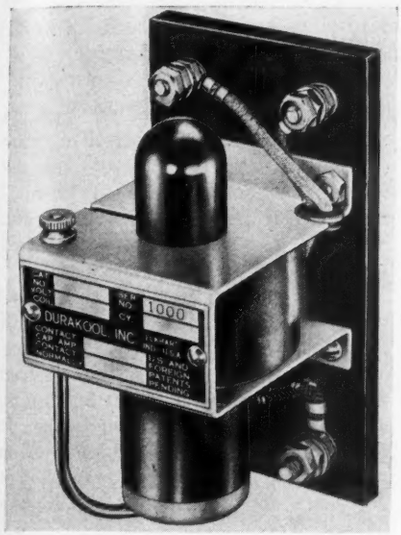
Another feature of the machine is that after the cleaning compound spraying has been completed, it is shut

off at the nozzle and a stream of clean water mixed with air is available for rinsing.

In addition to the cleaning compound, the machine requires only cold water and a supply of compressed air. The latter can be supplied by a 1 hp. compressor or from any available source.

Mercury Relay

DURAKOOL, INC., Elkhart, Ind., has announced a new mercury relay. This relay utilizes the unbreakable metal



Mercury relay.

body of the Durakool mercury switch and the displacement principle with solenoid actuation. The contact structure is hermetically sealed, making the relay suitable for use in corrosive or explosive atmospheres. The metal body is designed to hold a gas at a pressure of four atmospheres for the purpose of reducing the ionization between the contacts. Contact resistance is as low as 0.002 ohms. On alternating current, as little as 1 watt is required for normal closing operation and 1½ watts for normal opening operation. On direct current operation, the operating energy required is but 0.25 watts. The relay may be operated up to 300 times per minute.

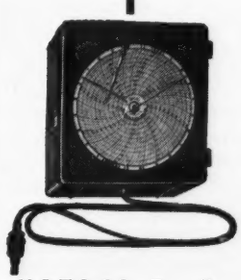
Cold Storage Room

LOW-TEMPERATURE EQUIPMENT CO., Kansas City, Mo., has developed a unit all-steel completely insulated cold storage room called the "Low-Temp". This room is suitable for the installation of any type of refrigerating system. It consists of interlocking wall and ceiling panels and floor sections. The pre-insulated steel sections are marked and delivered ready for assembly, together with blueprints and erection instructions.

√ FOR BAKING TEMPERATURE
√ FOR SMOKEHOUSE TEMPERATURE
√ FOR STORAGE TEMPERATURE
√ FOR DRYING ROOM TEMPERATURE
√ FOR BOILER TEMPERATURE

MOTOCO Indicating Thermometers have rigid stem for direct mounting or capillary tubing for remote reading. Priced from

$20



MOTOCO Recording Thermometers are priced from

$31

Temperature variations in food processing may result in production tie-ups; in excessive heating or cooling costs; in spoilage; complaints or "rejects". All of these restrict net profits and hamper business growth.

•

The simple, inexpensive solution to these problems is to use MOTOCO Indicating and Recording Thermometers at all points in the plant where temperature is important . . . let them show you where waste and loss are occurring.

•

MOTOCO Dial-type Thermometers are made and guaranteed by an organization that pioneered in the development of the dial thermometer, and that has long specialized in the manufacture of precision thermometers for industries where accuracy is essential.

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Invest NOW in MOTOCO Thermometers and profit from increased efficiency. Send a letter or post card today, requesting MOTOCO folder which gives full information. We shall be glad to submit recommendations for your particular requirements. Moto Meter Gauge & Equipment Division, The Electric Auto-Lite Company, Chrysler Bldg., New York, N. Y.

MOTOCO
INDUSTRIAL THERMOMETERS

The Song of the Potato Chip

A potato chip that looks better, that tastes better, yet costs less to produce is bound to prove a "best seller" in any community. All you need is the *equipment* that makes such chips possible . . .

FERRY CONTINUOUS POTATO-CHIP MACHINES

From a profit-making standpoint the Ferry machine has revolutionized the industry by automatically turning out from 50 to 350 pounds of top quality chips per hour, every hour. No undercooked, no burnt, no rancid chips as are unavoidable with the old expensive batch method.

If you are in the potato chip business to make money get all the facts on this low-cost, high-performance machine. Write us today for Bulletin F.9.

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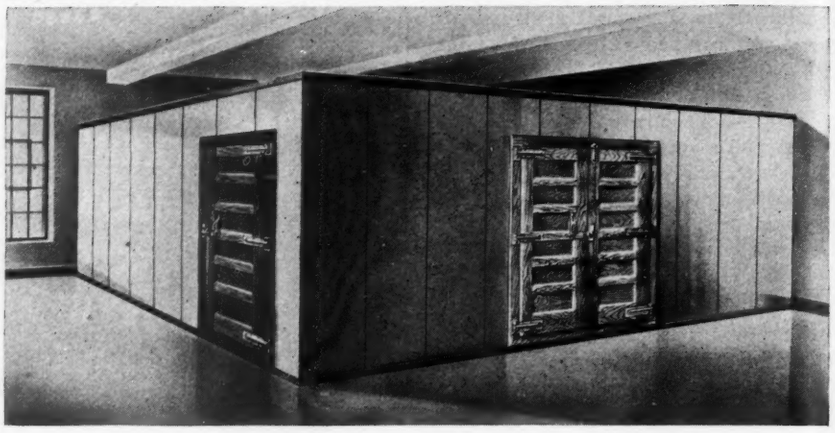


Unit cold storage room of prefabricated construction.

To assure low cost maintenance of various temperatures inside the refrigerated space, partition walls can be installed to provide as many separate compartments as are required. This makes possible the reservation of storage space for frozen foods at lower temperature.

Construction of this unit makes it possible to dismantle the entire room and re-erect it in another location without damage to the material. It also can be increased in size at any time merely by adding more panels. The panels are made of Armco galvanized Paintgrip sheets. This metal has a Bonderized finish which is said to take paint readily and to give long life in service. Underlying this finish is a full zinc coating for additional protection.

Vitamin A Meter

G. M. LABORATORIES, INC., 1733 Belmont Ave., Chicago, has developed a meter for the photoelectric measurement of Vitamin A concentration in such materials as codliver, halibut and other fish oils. The design of the meter is based on the principle of absorbing of certain wave lengths of ultra-violet radiation by Vitamin A. This absorption is determined by measuring the remaining ultra-violet radiation directly, using special photoelectric cells in a special circuit for the purpose. A single reading on a properly prepared sample is said to take less than five minutes.

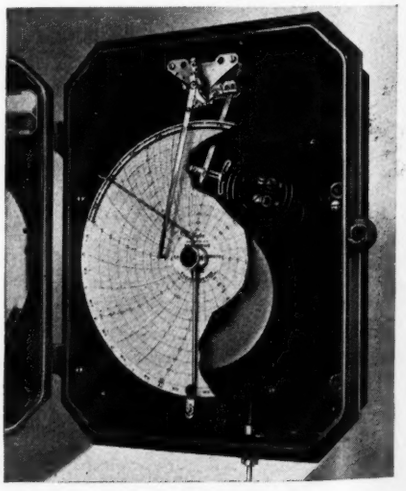
Sealing Compound

AMERICAN PRODUCTS MFG. CO., 8127 Oleander St., New Orleans, La., has developed "Inceloid" sealing compound for use in packaging. The material is a viscose solution which is applied to the outer face of containers made from fiber, metal, plastics and the like to act as a sealing and protective covering after filling. It is said that when this solution is used the package can be opened more readily than when stickers or tape are placed over the joints. The solution dries to a non-tacky film in less than 20 minutes and it is said to adhere to highly polished surfaces in a tenacious manner.

Being sufficiently fluid, this solution can be applied by means of brush, spray gun or by a printing operation which leaves the desired thickness of film for covering joints. The seal is impervious to moisture. It can be obtained in smooth, matte, or crackled surfaces and is available in all standard transparent colors or may be pigmented to form a metallic iridescent coating.

Recording Instruments

TO PROVIDE a companion line of recording instruments for the new line of Fulscope controllers described in *Food Industries*, p. 83, Aug. 1940, the Taylor Instrument Cos., Rochester, N. Y. has developed a new line of recorders for temperature, humidity, pressure, load, rate of flow, liquid level and other factors. Exclusive of



Recording instrument line developed as companion to recent control instruments.

the controller mechanism, these recorders are identical with the controllers. Even the cases are drilled and tapped to receive any of the five standard "Fulscope" control mechanisms should it be desirable to add controllers at some time. The new line of recorders is available for either face or flush mounting and has standard case finish in instrument panel black or white as specified. Dust and moisture are sealed from the case by the use of neoprene gaskets and a positive case latch.

In constructing the new instrument, stainless steel is used in the links, pivots and pen arms to give longer life. The chart plate is of die cast aluminum to give a rigid surface for pencil notations on charts and for carrying the chart clamp and pen lifter.

These instruments are available for 10 or 12 in. charts and with 1, 2 or 3 pens. Hundreds of standard chart ranges are available for selection.

Milk Cooler

York Ice Machinery Corp., York, Pa., has designed a large capacity milk cooler said to be characterized

Milk Cooler of compact design.

by its compact arrangement. This cooler is of the cabinet type and is made almost entirely from stainless steel, both inside and out. The entire cooler, except the bottom support, the ammonia header, and the gravity ammonia system is made of this metal in highly polished form. The milk cooling sections are die stampings welded and polished, permanently fixed to the ammonia headers and spaced for easy cleaning. The unit has hinged covers all around for speedy access. The corrugated cooler sections have been made thinner and with maximum surface contact.

Try This Easier, Faster, Better Way of Cleaning Blanchers!

BLANCHERS must be kept clean and sanitary to help maintain quality at an important point in processing . . . but many canners of peas, string beans and other vegetables have found that the thorough cleaning of blanchers is one of their most difficult jobs.

Yet this need not be so, if advantage is taken of that new and remarkable, time-saving development, the

OAKITE SOLUTION-LIFTING STEAM GUN

With it you reach all interior surfaces of your blanchers and quickly, easily remove deposits by the combined action of an Oakite cleaning solution, heat and mechanical force. You do the work in shorter time and more effectively than ever before. No motor, no pump, no pressure tank, no expensive apparatus is required . . . because all you need is a minimum steam pressure of 30 lbs. and the recommended Oakite cleaning solution. Cost of standard model is $17.50 f. o. b. New York. It also may be used for cleaning exhausters, scalders, cookers, kettles and many other types of cannery equipment as a regular sanitary procedure or before repainting or overhaul.

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Oakite Solution-Lifting Steam Guns are made in various sizes, are inexpensive and pay for themselves by the savings they establish in time and money. Write today for your copy of FREE descriptive booklet and data giving specifications, prices and methods of using.

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Food Technology

NEW DISCOVERIES & INVENTIONS

BAKERY PRODUCTS

Preserved Bread

FOR MAKING preserved bread, 1 part by weight of leaven is treated with 5 parts by weight of water containing 0.5 percent sodium sulphate, 2.5 percent sodium chloride and 0.2 percent sodium carbonate. As the invention is described in French Patent 842,122 (application filed June 6, 1939, by Societe pour l'Etude des Procedes de Conservation du Pain, Paris, France), the treated leaven is mixed with 6 parts by weight of flour and made into a dough with 5 parts by weight of water containing the salts already mentioned, in the same proportions, and with 0.15 part by weight of a softener which may be glycerin or an edible fat. The dough is placed in a cool oven, at 140 to 158 deg. F., and baked at approximately 480 deg. F.

BEVERAGES

Whey in Brewing Instead of Water

ACCORDING to Holland Patent Application 86,250 (filed Feb. 3, 1938, by G. Roeder of Leipzig, Germany), use of whey instead of the usual brewing water gives an improved beer. The whey is heated sufficiently to coagulate a portion of the protein and bring the pH value nearly to the neutral point but slightly on the acid side, namely to 6.5. In a modified form of the process, extractives from whey are added to malt.

Nutritional Elements in Pulque

PULQUE, the popular Mexican beverage made by fermenting agave, is comparable to beer in alcohol content but differs from beer in important respects. On the average, pulque contains 94 percent water, 3.6 percent ethyl alcohol, 0.9 percent soluble gums and 0.3 percent inorganic salts, with only about 0.17 percent protein.

A particular feature in which pulque differs from beer is that it contains water-soluble vitamins, namely about 6.5 units of vitamin C and 25 to 30 units of vitamin B_1 per cubic centimeter. These quantities of vitamins C and B_1 are considered sufficient to meet daily requirements with only moderate consumption of the beverage. As commonly prepared in Mexico, pulque contains traces of amyl and methyl alcohols, both of which are more toxic than ethyl alcohol.

From the nutritional standpoint the vitamins in pulque are the important ingredients, but even though the protein content is low the amino acids derived from the proteins offer some nutritional value.

Condensed from "Study of the Food Value of Pulque," J. Roc and R. Llamas, *Anales Inst. Biol. Mexico* 11, 363-71, 1940 (Published in Mexico).

CANNING

Adequate Pasteurization Prevents Curd Formation In Canned Grapefruit Juice

INADEQUATE PASTEURIZATION is responsible for the formation of white rings at the head space line, as well as for curd-like deposits and abnormal sedimentation in canned grapefruit juice.

In citrus fruits the stability of colloids in suspension depends on the natural pectin content of the juice. Proper heat treatment prevents enzymatic hydrolysis of the pectin. Although low temperature pasteurization would be sufficient for the prevention of spoilage, pasteurization temperatures of 180 to 190 deg. F. are necessary to avoid curd formation. Flash sterilization, vacuum closure and heat treatment in the can is equally as satisfactory as kettle sterilization, as long as time and temperature are sufficient to prevent curd development. With flash or kettle sterilization it is advisable to invert or roll the can for at least 1½ minutes before placing it into the cooling water.

Neither the variety of the fruit, the maturity of the fruit, the amount of pulp included, the manner of aeration, nor the artificial sweetening has an appreciable effect.

Although these defects usually become apparent within three months after packing, time is an essential factor in curd formation, and short time storage samples may be deceptive in indicating the adequacy of pasteurization.

Digest from "Prevention of Curd in Grape Fruit Juice," by C. T. Parks. Presented before the Canning Problems Conference of National Canners Association, Chicago, January, 1940.

Canning Destroys Bacterial Toxins

BACTERIAL TOXINS are delicately susceptible to heat. For instance, the toxin of *Cl. botulinum* is destroyed by temperatures much lower than that required to kill the spores of this organism. The toxin from type *A* is inactivated in from 6 to 10 minutes at 176 deg. F., whereas the toxins of types *B* and *C* must be exposed to this temperature for from 15 to 30 minutes.

Times and temperatures commercially employed to insure the destructions of the spores of *Cl. botulinum* are more adequate for the inactivation of the gastro-intestinal irritant elaborated by certain strains of staphylococci. Therefore, canned food is safe and beyond suspicion as a vehicle for the transmission of this type of food poisoning.

DAIRY PRODUCTS

Determining the Bacterial Content of Dairy Products

THE AMERICAN Public Health Association put into use on July 1, 1939, a new official medium for the standard bacterial plate count of milk and ice cream. This new medium is a compromise between the old official medium and the tryptone-glucose-skim milk agar also suggested by Bower and Hucker. Numerous samples of raw milk, pasteurized milk and cream and ice cream, plated on these three media, show that the new meduim has decided advantages over the old. In general it gives higher count, also larger and more easily counted colonies. When an incubation temperature of 32 deg. F. is used in place of

LET EXPERTS

Put a finger on your carton problem!

Send your problem to the Gardner-Richardson Carton Advisory Council . . . let these experts help you find the answer.

DON'T let your folding carton problems put wrinkles in your brow . . . place them before Gardner-Richardson's experts for analysis and study. The recommendations you get from these men may show you the way to increased sales through greater carton effectiveness—to lower costs through carton economies.

The ten experts of the Gardner-Richardson Carton Advisory Council know the possibilities of boards and printing . . . the chemistry of inks . . . how to get better filling machine performance. They have an intimate knowledge of retail display . . . of product protection . . . and they are practical when it comes to costs.

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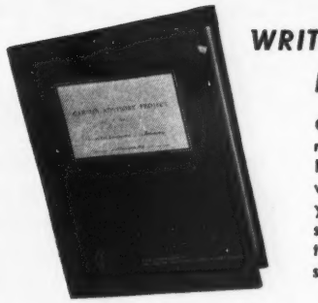

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37 deg., the increase in count is less for the new medium than the old. The new medium gives about the same total counts as the tryptone-glucose-milk agar.

Digest from "The Effect of the New Standard Milk Agar on the Plate Count of Dairy Products," by F. E. Nelson, *Journal of Bacteriology* 39, 262, 1940.

Butter Flavor

THE DESIRABLE FLAVOR of butter, apart from that of the fat and other constituents, is due to traces of diacetyl. This is produced by a mixed culture, part of which acts on the citric acid in the cream to produce acetylmethylcarbinol, which is in turn converted to diacetyl. The other part froms lactic acid and thereby controls the acidity to favor diacetyl production. Aerated cultures produce considerably more diacetyl than unaerated ones. There is little difference whether the cream and culture be agitated or not, or between salted and unsalted butter. The diacetyl content of salted butter does not decrease much on storage at –10 to 0 deg. F. and is retained surprisingly well at 36 to 45 deg., and even at 70 deg. With unsalted butter the higher storage temperatures may cause increases or decreases in diacetyl content owing to bacterial action.

Digest from "Changes in Diacetyl and Acetylmethylcarbinol Contents of Butter at Various Temperatures," by E. A. Prill and B. W. Hammer, *Journal of Dairy Science* 23, 159, 1940.

Eyes in Swiss Cheese

ONE of the principal organisms responsible for ripening in Emmental cheese is *Thermobacterium helveticum,* which is a vigorous lactic acid former and also an active agent in breaking down casein. Next comes *Streptococcus thermophilus,* which helps to impart the desired acidity but does not decompose casein. As the names indicate, both are thermophilic organisms, thriving at higher temperature than would be favorable to ordinary microorganisms.

Equal in importance as a ripening agent is a *Streptobacterium casei,* which forms lactic acid. Unlike the others, its optimum temperature for growth is relatively low (86 deg. F.), and it can even develop slowly at 50 deg. F.

Following two stages of enzyme action, the ripening cheese undergoes a true fermentation in which the eyes (bubbles of carbon dioxide gas) are formed. Since the lactose in Emmental cheese is used up in the first few days of ripening, this fermentation must utilize some other nutrient. Tests show that the actual nutrient is calcium lactate.

Digest from "Theory of Ripening in Hard Cheese," by S. Orla-Jensen, *Le Lait* 20, 2, 1940 (Published in France).

Soft-curd Milk Prepared by Homogenizing

CURD TENSION is diminished in normal whole-curd milk by homogenizing one-fifth of the milk to a low curd tension and mixing the homogenized portion with the main body of the milk. Another procedure is to allow fresh whole milk to stand three hours and then to homogenize the lower four-fifths at a high pressure and the upper one-fifth at a low pressure, after which the two homogenized portions are mixed.

The object of the treatment as disclosed in Canadian Patents 389,031 and 389,932 (granted May 28, 1940, to E. W. Smith and assigned to Submarine Signal Co., of Boston, Mass.) is to prepare a soft-curd milk from fresh whole milk.

In the method in which the milk is separately homogenized in two portions, the pressure homogenizer is operated at 2,000 lb. per square inch

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for the skim milk portion and 1,500 lb. per square inch for the cream portion. The effect of this pressure difference is that the fat globules are not too finely dispersed for subsequent separation of cream. Thus the homogenized product is a soft-curd whole milk from which the cream can still be obtained separately.

FISHERY PRODUCTS

Better Tuna Refrigeration

EXPERIMENTAL refrigeration tests on a California State Fisheries Laboratory tuna boat clearly indicate the necessity of differentiating between *chilling* the fish (from about 85 deg. F. to the storage temperature) and actual *storage* as distinct refrigeration operations which should be carried on independently with separate compartments and refrigerating circuits for each. Separate operation can be effected by using the small well, first as a chilling well and then as a storage well, the chilling brine being pumped to a different chilling well. Again, the fish may be chilled and then transferred to a storage well.

The first method requires a system of brine lines and valves even more complicated than those now employed on tuna boats. The second method calls for extra labor in transferring the fish from chilling to storage space. Mechanical setups on tuna boats are already too complicated for consistently efficient operation, and it is considered preferable to transfer the fish even though it adds to the work of the crew.

The chilling and storage tests led also to these conclusions:

1. Fish should not be allowed to lie on deck awaiting a convenient time for transfer to the chilling well. The fresh catch should go directly to the chilling brine, or with the least possible delay.

2. Chilling to 20 deg. F. will take about 48 hours for 2-pole fish, longer for larger fish.

3. Direct chilling in brine at storage temperature is preferable to 2-stage chilling in a warmer brine (e.g. at 30 deg. F.) and then in the cold brine.

4. The lowest feasible storage temperature should be used, and it should not be higher than 20 deg. F. Tests at 25 deg. F. were distinctly less effective in maintaining first class quality and freshness in stored tuna.

Digest from "Conclusion and Summary of Detailed Progress Report No. 2 on the Refrigeration of Tuna," by H. C. Godsil, California State Fisheries Laboratory, July 15, 1940. (Complete report available for consultation at the California State Fisheries Laboratory.)

FOOD TECHNOLOGY

How to Increase Effectiveness of Antiseptics

EFFECTIVENESS of an antiseptic or bactericidal agent is dependent, in many cases, on the arrangement of the toxic group in the molecule as well as the presence of such groups.

Benzoic acid, which is produced from the byproducts of the coking process, has been used as its sodium salt for years as a mild antiseptic agent in ointments and as a preservative in catsup and other food products. It has been found, moreover, that an increase in the length of the side chain has an enhancing effect on compounds of this type, such as the phenylalkanoic acids, as antiseptics. Phenylbutyric acid, for example, which is butyric acid obtained from butter with one of the hydrogen atoms replaced by a benzene nucleus, is about four times as effective as a bacteriostatic agent as is benzoic acid.

The antiseptic properties of these

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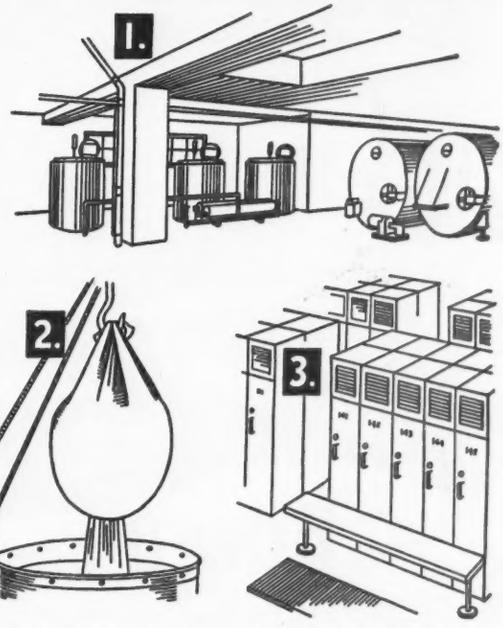
Preserve Purity Prevent Spoilage

1. In thousands of dairy plants throughout the country, HTH Products are proving their effectiveness every day in controlling bacteria on equipment of every kind—receiving tanks, holding tanks, filters, coolers, pasteurizers, bottle-fillers, sanitary piping, etc.—and doing it quickly, positively and economically. Bottles, too, are safer when the final rinse solution is made from HTH Products.

2. Cheese bags used to present a difficult problem, but not since cheese plants discovered the effectiveness of HTH Products. Now they simply wash bags in hot water and an alkali cleanser, rinse in warm water, immerse in a 200 p.p.m. solution for a few minutes, then rinse out the remaining chlorine solution. Throughout the plant, too, they use HTH Products for controlling bacteria.

3. Modern food plants not only drill their employees constantly on the necessity of bacteria control in the plant, but maintain a rigid sanitary routine *everywhere* on the premises, including cafeterias, recreation rooms, locker rooms, toilets, etc. And they find HTH Products just as effective for deodorizing and disinfecting in such areas as for bacteria control in the plant itself.



Food and beverage plants find that HTH Products offer an effective means of combatting bacterial contamination that results in a real dollars and cents saving.

Let HTH Products show what they can do in *your* plant. These dependable chlorine sterilizers come to you in powder form, convenient to use.

Added to water, they make quick-acting germicidal hypochlorite solutions of the desired strengths for wiping, flushing or spraying all surfaces with which food or beverage products come in contact. HTH Products are so economical, they may be used freely. They do a thoroughly effective job.

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compounds may be enhanced fivefold or more by the introduction of substituent groups in place of one or more of the hydrogen atoms on the benzene nucleus. When a hydrogen atom on the nucleus in phenylbutyric acid is replaced by a bromine atom, the antiseptic properties are increased about fivefold provided the bromine is introduced at the so-called para-position. If, however, the substitution is effected in the adjacent position on the benzene nucleus, there seems to be a decrease in antiseptic and bactericidal action rather than an increase in such activity.

This generalization seems to hold, according to the results of this study, for alkyl, amino, halogen, hydroxy, nitro and other groups.

This study, together with previous work reported by Degering and collaborators, indicates that (1) the acidity of the antiseptic is a very important factor in its relative effectiveness, (2) the bacteriostatic and bactericidal activity may be increased as much as fivefold by an increase in the side chain, and (3) the introduction of substituent groups in the para-position may enchance the effectiveness of the antiseptic as much as fivefold.

The increase of acidity of an antiseptic from that of water which has a pH of 7 to that of tomato juice which has a pH of about 3.5, may result in a five- to tenfold increase in antiseptic and bactericidal properties. When this is multiplied by five as a consequence of increasing the side chain and again by five as a result of substituent groups in the para-position on an aryl nucleus, one has increased the effectiveness of a rather mild antiseptic somewhere between one to three hundredfold.

Digest from "The Effect of Ortho Substituents on the Bacteriostatic Properties of Phenylacetic Acid." by Degering, Tetrault, Feasley and Gwynn. A paper presented at the Detroit meeting of American Chemical Society, September, 1940.

Sedimentation in Fruit Juices

PERMANENT precipitates are formed in fruit juices under conditions which permit a reaction between proteins and pectin or gallotannin. Freedom of juices from cloudiness even when chilled to 32 deg. F. may be attributed to the absence of the higher proteins such as globulin. Among the precipitates which are more or less specific to certain juices are hesperetin, sometimes crystallizing from orange juice in needles as a result of enzymatic hydrolysis of hesperidin, and calcium oxalate in tomato juice. The enzyme which forms hesperetin in orange juice is inactivated at 185 deg. F. Discoloration sometimes occurs in fruit juices without forming a sediment. This is especially likely to happen in juices containing catechol tannin, which oxidizes when exposed to air, or flavone glucosides, which hydrolyze during long storage in bottles. For all cases of sedimentation, discoloration and spoilage caused by microorganisms, and for many other cases, an effective preventive treatment is filtration through a specially prepared asbestos pulp.

Digest from "Deterioration and Sedimentation in Fruit Juices," by Hirosi Naito. *Bulletin of the Institute of Physical and Chemical Research* (Tokyo) 19, 721, 1940 (Published in Japan).

GRAIN PRODUCTS

Fumigating Cereals

AMONG the various fumigants used for destroying insect pests in grain and flour there are certain individual characteristics which must be considered in making a choice of a fumigant for specified purposes. For example, carbon disulphide is limited by

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its extreme flammability to use in establishments equipped for its safe handling in small fumigation units. Exposure time should be limited to 24 hours, but germinating power is not injured in less than about 36 hours.

Chloropicrin is nonflammable but highly toxic, requiring adequate respiratory protection for workmen. It does not injure baking quality but destroys germinating power and so cannot be used for seed grain nor for barley to be malted. Ethylene oxide, diluted 9:1 with carbon dioxide, is said to be effective without destroying germinating power, although the undiluted gas cannot be used for seed grain.

A heavy, nonexplosive gas is obtained by blending ethylene dichloride and carbon tetrachloride (3:1). With 50 cc. of this gas in a hectoliter of wheat, a high kill is obtained. Hydrogen cyanide offers high toxicity and penetrating power, without damage to germinating power of grain or baking quality of flour. Its relatively high unit cost is at least partly compensated by its high efficacy.

Finely powdered silica has been tried, because wheat exposed to fine wind-blown sand in Morocco and Algeria is free from insect pests. Apparently the dry desert atmosphere also contributes to the effect, for silica powder has not been successful elsewhere.

Digest from "Protecting Cereals and Flour From Insect Pests During Storage and Transport," by Dr. Kadoosa, *Brasseur francais* 4, 162, 1940 (Published in France).

MEAT PRODUCTS

Canadian Wiltshire Bacon

SINCE the characteristic color of Canadian bacon is thought to be mainly due to the formation of nitrosohemoglobin from nitrite and muscle hemoglobin, a study has been made of nitrate content as related to temperature. Probably cooking, and perhaps even smoking at relatively high temperatures (above about 130 deg. F.), convert nitrosohemoglobin to a more stable form.

Small cuts of matured Wiltshire bacon were held at 68, 104, 122, 140, 158 and 176 deg. F. for periods of 5, 10, 20 and 40 hours. The highest nitrite content was observed at 104 deg. F. and was followed by a logarithmic decrease as the temperature rose from 104 to 176 deg. F. Since the normal nitrite content occurred at about 130 deg. F., it appears that the nitrite content rises above normal at temperatures below 130 deg. F., but falls off again with heating. A comparable increase in nitrite content was not observed in commercial cuts. Greater area exposed to air in the small samples may be responsible for this difference perhaps by favoring aerobic bacterial action.

Bacteria may aid in nitrite production, but is is also possible that enzymes or other constituents in the meat raise the nitrite content by reducing nitrates. Nitrite losses above 130 deg. F. may be due to oxidation (nitrite to nitrate) or combination with constituents of the meat.

Digest from "Canadian Wiltshire Bacon, XI. Effect of Heat Treatment on Nitrite Content," by W. H. White, W. H. Cook and C. A. Winkler, *Canadian Journal of Research* 18D, 260, 1940 (Published in Canada).

OILS & FATS

Role of Catalase In Fat Spoilage

CATALASE, an enzyme which assists in the decomposition of hydrogen peroxide, has some influence in preventing oxidation of unsaturated compounds in fats. Its antioxidizing action is indirect, in that it is accomplished only by destroying an active oxidizing agent (hydrogen peroxide), but there is some evidence that this is one of the functions of catalase in nature. Oxidation is one of the leading causes of spoilage in edible fats, and catalase is present in many biological materials which contain fats.

To test the action of catalase in protecting sensitive fats from spoilage by oxidation, a special catalase preparation was made from liver and added to olive oil. The course of oxidation was followed by chemical analysis. Catalase definitely inhibited the autoxidation which normally occurs in olive oil under oxidizing conditions. The antioxidizing effect did not run parallel to the catalase activity, probably because the liver extract contained some other factor having a variable influence on the result.

Digest from "Chemistry of Fat Spoilage, X. Participation of Catalase," by K. Täufel and R. Müller, Biochemische *Zeitschrift* 304, 275, 1940 (Published in Germany).

VITAMINS

Vitamin A in Fish Liver Oils

THREE METHODS for extracting fish liver oils were compared as to yield and quality of oil. They were acetone extraction, dehydration with anhydrous sodium sulphate followed by benzene extraction, and benzene extraction under conditions favoring formation of a binary benzene:

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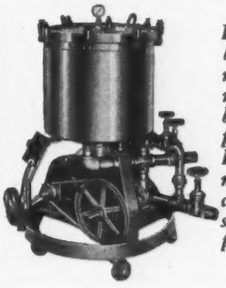

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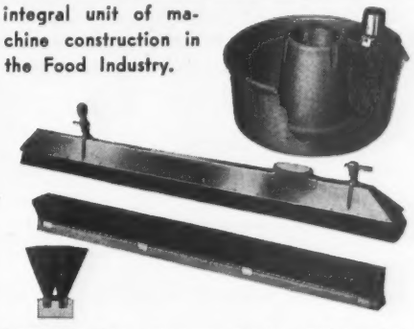

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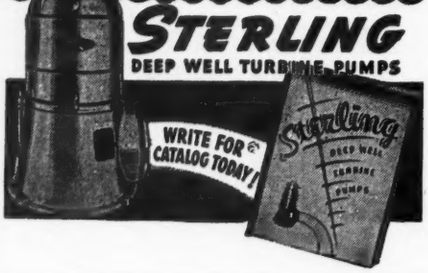

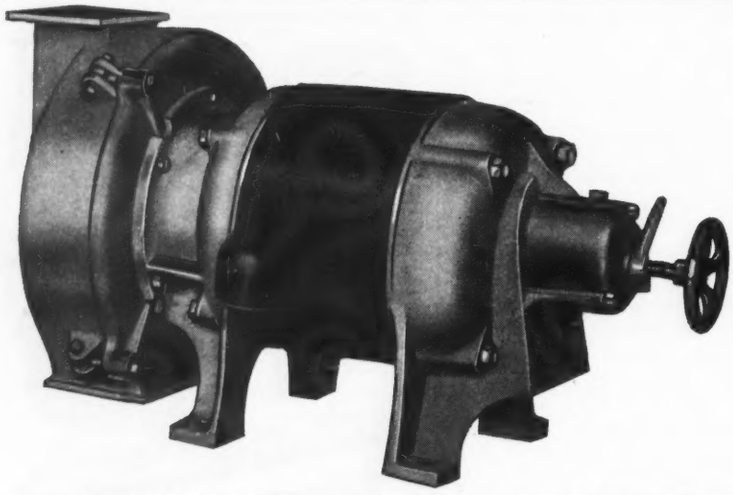

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water mixture so that water and oil are extracted simultaneously.

In general the binary mixture method gave the highest yield but not the best quality of oil. The reddish yellow color was distinctly deeper in oils extracted by this method.

Extreme variability has been reported in the vitamin A content of fish liver oils, with the maximum 2,500 times greater than the minimum. In these tests the range was wide but not as wide as 2,500 to 1. Liver oils of hake, weakfish, shad and gilthead were richer in vitamin A, some several times over, than the U.S. Pharmacopeia requirement (60,000 international units per 100 g.) for cod liver oil. The highest observed vitamin A content was 283,700 I.U. in shad liver oil, followed by 278,700 in eagle ray, 229,800 in weakfish and 198,300 in gilthead liver oils. These are maximum figures in each case. The minimum for each kind of fish was much lower, even below the required 60,000 I.U., since there is wide variability even in a single species of fish.

Digest from "Vitamin A Content of Argentine Fish Liver Oils," by Ascension O. Castellanos, *Anales de la Asociation Quimica Argentina* 28, 91, 1940 (Published in Argentina).

Vitamin C In Grapefruit Juice

GRAPEFRUIT is a new crop in the subtropical regions of the Soviet Union. One of its principal dietetic merits is as a source of vitamin C (ascorbic acid), the antiscorbutic vitamin. Daily intake of 40 c.c. (1.35 fluid ounce) of grapefruit juice suffices to prevent or cure scurvy in man. A study was therefore made of ascorbic acid in fresh and canned grapefruit. The loss of vitamin C potency in canning was only about 20 percent. Allowing also for the difference between juice and pulp, 100 g. (a little less than 4 oz.) of canned grapefruit is the approximate daily intake needed to prevent or cure scurvy.

Effects of canning on antiscorbutic potency of grapefruit were studied by two chemical methods and by biological tests with guinea pigs. One chemical method (Tillmans' titration with 2, 6-dichlorophenylindophenol) showed 0.0415 to 0.0484 g. of ascorbic acid in 100 g. of juice (average 0.04535); the other method (iodometric titration) showed 0.0431 to 0.0475 g. (average 0.04547). The biological assay was in satisfactory agreement with the chemical determinations, indicating the presence of about 0.05 g. of ascorbic acid in 100 g. of juice.

Digest from "Vitamin C Content of Fresh and Canned Grapefruit," by L. P. Stravchinskii, *Voprosy Pitaniya* 9, 54, 1940 (Published in Russia).

Books

How British Make Soup

SOUP MANUFACTURE AND CANNING. By Raymond H. Binsted. Published by Attwood & Co., Ltd., St. Ann's Chambers, Waithman St., Pilgrim St., London, E.C. 4. 1940. 124 pages; 5¾x 8¾ in.; cloth. Price, 25 shillings.

As the name indicates, this book is a practical treatise on how to manufacture and can soups commercially. It gives formulas for different kinds of soups consumed in Britain and tells how the British manufacture them. There may be something here for American manufacturers looking for new types of products to put on the market.

Wine and Beer Guide

CROSSMAN'S GUIDE TO WINES, SPIRITS AND BEERS. By Harold J. Crossman. Published by Sherman & Spoerer, Inc., 130 W. 46th St., New York, N. Y. 1940. 404 pages; 7x9½ in.; cloth. Price, $5.

For those who desire to acquire a good all-around knowledge of the history, packaging, sale and dispensing of alcoholic beverages, this book is made to order. Technologists will find it useful only in providing them with a general background of information, but men in the sales end of the wine and beer industries can make practical use of it. There is much between the two covers which will make good public relations ammunition.

Handbook of Refrigeration

REFRIGERATING DATA BOOK. Vol. 2. Published by American Society of Refrigerating Engineers, 37 W. 39th St., New York, N. Y. 1940. 402 pages; 6½x9½ in.; cloth. Price, $4.

Anyone commercially interested in freezing foods probably will find the first 53 pages of this book worth "the price of admission." Those pages make up Part I, which is devoted to freezing processes. There are chapters on the theory of freezing foods, by J. G. Woodroof; preparation for freezing, by D. K. Tressler; quick freezing fruits, by H. C. Diehl; quick freezing vegetables, by H. C. Diehl; poultry refrigeration, by George F. Stewart; fish refrigeration, by J. M. Lemon; bacteria and frozen foods by Jesse Q. Sealey; and nutrition of frozen foods, by Jennie S. Wilmot. Much pertinent data and information vital to successful commercial quick freezing is contained in these chapters.

The other parts of the book cover refrigeration and processing, cold storage, distribution of foods, industrial refrigeration, comfort air conditioning and industrial air conditioning. The section on distribution of foods, like that on freezing of foods, is of particular value to the food industry. It contains chapters on heat-load calculations, foods in commercial refrigerators, restaurant refrigeration, locker plants, cooling fresh vegetables, refrigeration of cars and trucks, uses of dry ice and insulation of storage rooms.

Lists 5,500 Super-Markets

FITCH'S LIST OF SUPER-MARKETS. Compiled by Fred S. Clark. Published by Francis Emory Fitch, Inc., 138 Pearl St., New York, N. Y. 1940. 127 pages; 5x8 in.; paperboard. Price, $10.

Five thousand five hundred supermarkets are listed in this directory. The markets listed are retail self-service grocery stores having 5,000 sq.ft. of floor space and annual sales of $250,000 or over. Food manufacturers interested in doing business with super-markets should find this directory valuable.

Waste Disposal Abstracts

WATER POLLUTION RESEARCH. Published by the Department of Scientific and Industrial Research, Teddington, Middlesex, England. 1940. 36 pages; 6x9⅝ in.; paper. Price, 2s. Available from His Majesty's Stationery Office, London, England.

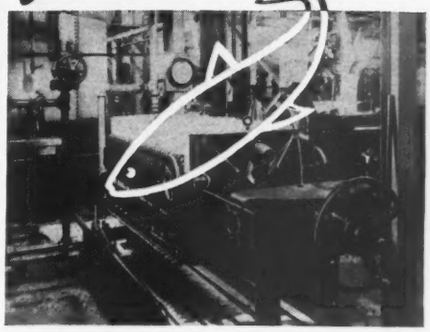
This is a summary of current literature on water pollution research, and it contains 138 brief abstracts from periodicals published throughout the world. It will be useful to those in the food industries concerned with waste disposal problems.

Canned Foods Commended

THE POISON TRAIL. By William F. Boos, M.D. Published by Hale, Cushman and Flint, Inc., 489 Fifth Ave., New York, N. Y. 1939. 362 pages; 5¾x8¾ in.; cloth. Price, $3.

This is not a murder mystery. It is a popular book of a practical nature discussing the poisonous substances with which people may come in contact. Its particular interest to the food industry lies in the fact that ptomaine poisoning is debunked and canned foods are given a clean bill of health. There may be some ideas and information here for public relations departments.

What! FilterSardines?



Of course not! We'd never suggest it nor could we, if we tried. But how about sardine, olive or cottonseed oil (in which those sardines are packed) or any other organic oil used in the food industries?

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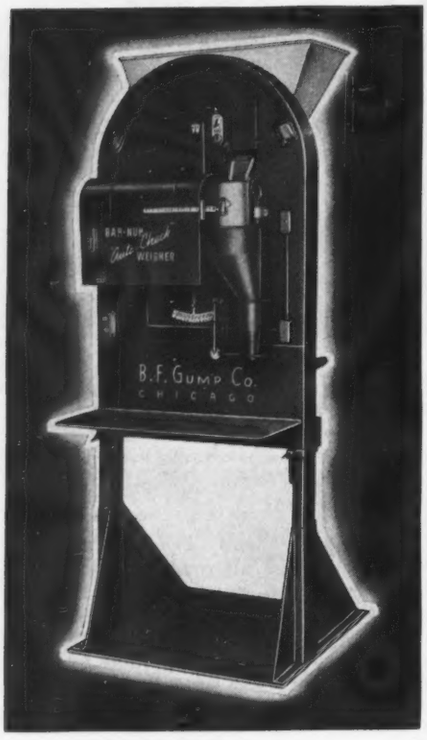

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Patents

Potato Salad in Sealed Containers Pasteurized by Heating Between 190 Deg. F. and the Boiling Point of Water—Ellis R. Meaker, to Ivanhoe Foods, Inc., Auburn, N. Y. No. 2,206,483. July 2, 1940.

Crisp Baked Wafer With Thickness of 1/32 to 7/32 in. Made From Malted Wheat Flour—Conrad F. Schreier, Highland Park, Ill. No. 2,206,619. July 2, 1940.

Degradated Protein Products Made From Soya Flour or Meal—Charles Weizmann, Kensington, London, England. No. 2,206,622. July 2, 1940.

Alcohol Beverage Made by Fermenting Fruit Juice to Which Dextrose is Added, Treating With Activated Carbon to Produce Neutral Tasting Base, Carbonating and Then Flavoring Carbonated Base—Richard M. Draeger, Beaver Dam, Wis. No. 2,206,719. July 2, 1940.

Egg White Residues Recovered From Egg Shells by Mechanical Means—John C. Irish, Kansas City, Mo. Nos. 2,206,959 and 2,206,960. July 9, 1940.

Coating for Ice Cream and Other Frozen Confections Made from Sugar, Glucose, Soft Fat, Condensed Milk and Hard Fat—Robert C. Vogel, Robert W. Coblentz, and William A. Capstick, Dayton, Ohio. No. 2,207,034. July 9, 1940.

Coffee Solids Used as Molding Material—Herbert S. Polin, New York, N. Y. No. 2,207,069. July 9, 1940.

Bread Slices Carried Through Toasting Zone by Pairs of Upright Arms on Conveyor Chain at Spaced Intervals—Lester Neuberger, to Ward Baking Co., Bronx, N. Y. No. 2,207,264. July 9, 1940.

Jelly With Low Sugar Content Made by the Use of an Insoluble Alkaline-earth Metal Pectate, a Dispersing Agent and a Food Acid—Nathan M. Mnookin, Kansas City, Mo., to Speas Co. No. 2,207,299. July 9, 1940.

Potato Slices Deep-fat-fried in Vat Which Gradually Decreases in Temperature From Feed End to Discharge End—Joseph D. Ferry, Harrisburg, Pa., by Sylvia O. Ferry, Executrix. No. 2,207,316. July 9, 1940.

Cod Liver Oil Subjected to Molecular Distillation Preliminary to Recovery of Vitamin D By Saponification of the Distillate—Gerald G. R. Smith to Distillation Products, Inc., Rochester, N. Y. No. 2,207,385. July 9, 1940.

Doughnut Forming Machine—Stephen A. Gardner to Dough-King Inc., Minneapolis, Minn. No. 2,207,584. July 9, 1940.

Doughnuts Turned While Passing Through Flattened Twisted Duct In Current of Cooking Liquid—Alexander S. T. Lagaard, Minneapolis, Minn. No. 2,207,590. July 9, 1940.

Doughnuts Cooked Under Controlled Conditions During Passage Through Cooking Vat—Alexander S. T. Lagaard, Minneapolis, Minn., to Dough-King, Inc., Minneapolis, Minn. No. 2,207,591. July 9, 1940.

Milk-bottle-case Washing Machine Made to Have Three Conveyor Units of Which the Feeder Conveyor Moves More Rapidly Than Those in the Washer Zone and on the Delivery End—Ira H. Kendall, to Genevieve A. Kendall, Potsdam, N. Y. No. 2,207,697. July 16, 1940.

Oil-soluble Vitamins Concentrated in Liquid Portions of Fish and Vegetable Oils After Hydrogenation at a Pressure Between 50 to 300 lb. per Square Inch and at a Temperature Between 75 and 95 Deg. C.—James G. Blaso, East Elmhurst, N. Y., to Natural Vitamine Corp. No. 2,207,712. July 16, 1940.

Milk Products Deodorized by Heating and Discharging in Finely Divided Form Into Vacuum Chamber Through Which Circulates Nascent Oxygen—Milton E. Parker, Barrington, and Fred C. Brengman, Elmhurst, Ill., to Beatrice Creamery Co., Chicago, Ill. No. 2,207,817. July 16, 1940.

Wheat Flour and Other Milling Products Bleached by Mixing With a Dry Free-flowing Powder Consisting of Benzoyl Peroxide, Potassium Aluminum Sulphate Containing 24 Moles of Water of Crystallization, and Magnesium Carbonate—Frederic H. Penn, Dallas, Tex. No. 2,208,471. July 16, 1940.

Doughnut Machine With a Cooking Chamber Constructed to Cause Flow of Cooking Liquid From Feed End to Delivery End—Peter J. Toews, Minneapolis, Minn. No. 2,208,874. July 23, 1940.

Cooking Liquid in Doughnut Machine Maintained at Desired Level in Cooking Channel by Dam Across Channel at Discharge End Over Which Liquid Flows Into a Constant-Temperature Reservoir—Alexander S. T. Lagaard, Minneapolis, Minn. No. 2,208,875. July 23, 1940.

Cooking Channel in Doughnut Machine Divided Into Upper and Lower Passageways by a Solid-surface Drop Plate Extending From Beneath Depositor Toward Turning Device as an Aid to Maintaining Definite Rates of Flow in Cooking Liquid—Alexander S. T. Lagaard, to Dough-King, Inc., Minneapolis, Minn. No. 2,208,876. July 23, 1940.

Doughnuts in Cooking Machine Carried From Feed End to Discharge End of Cooking Channel by Mechanically Driven Cooking Liquid—Fred C. Caswell and Alexander S. T. Lagaard, to Dough-King, Inc., Minneapolis, Minn. No. 2,208,877. July 23, 1940.

Washed Raw Sugar Dissolved in Raw Milk; Treated with Clarifying Agent Consisting of Tricalcium-phosphate, Calcium Carbonate and Aluminum Hydroxide; Filtered for Removal of Undissolved Solid Material, Including Clarifying Agent; and Evaporated to Produce Sweetened Condensed Milk—William D. Horne, Beech Creek, Pa. No. 2,209,202. July 23, 1940.

Sterilized Food Passed Through Chamber for Treating and Sterilizing Cans and Maintained Under Sterile Atmosphere Conditions at Natural Pressures Until Canned—Charles O. Ball, Oak Park, Ill., to American Can Co., New York, N. Y. No. 2,209,315. July 30, 1940.

Condensed Milk Containing Not More Than 35 Percent Water Cooled by Passage Through Chilled Roll Refiner To Prevent Crystallization of Lactose Content—Julius F. Dietrich and Richard H. Dietrich, Sheboygan, Wis.; Richard H. Dietrich administrator. No. 2,209,328. July 30, 1940.

Liquids Sterilized During Passage Between and in Contact With Closely Spaced Surfaces of Two Different Metals Without Contact With Air; Metal Surfaces Heated to and Maintained at Different Elevated Temperatures Below 100 Deg. C.; One Metal Capable of Splitting Off Bactericidal Metal Ions—Wincenty Matzka, Grasse, France, to The Matzka Corp., Wilmington, Del. No. 2,209,345. July 30, 1940.

Bakery Doughs Made in Vacuum Type Mixer—Ambrose K. Brennan and James M. Jans, to Read Machinery Co., York, Pa. No. 2,209,559. July 30, 1940.

Glacé Fruit and Fruit Peel Made on Bulk Production Scale—Charles Lachman, to S & W Fine Foods, Inc., San Francisco, Calif. No. 2,209,889. July 30, 1940.

Soya Oil Refined by Subjection to Temperatures of 250 to 300 Deg. C. in an Inert Atmosphere for About 10 Minutes Preliminary to Caustic Alkali Refinement—Anderson W. Ralston and Victor Conquest, to Armour & Co., Chicago, Ill. No. 2,209,904. July 30, 1940.

Baking Pans Greased by Mechanical Spraying With a Fluid Consisting of 1 to 5 Parts of Starchy Gluten-free Powder, 5 to 15 Parts of an Edible Fat—Samuel Scherr, Baltimore, Md. No. 2,210,043. Aug. 6, 1940.

Fresh Fruits and Vegetables Prepared for Market by Treatment With an Alkaline Hypochlorite Solution of 0.3 to 1.5 Percent Available Chlorine Strength and a pH of About 7.5 to 9.5 Obtained by the Addition of a Sodium or Potassium Salt of Acetic Boric Citric, or Tartaric Acids—Jagan N. Sharma, Los Angeles, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,210,133. Aug. 6, 1940.

Dust Explosions Avoided

(*Continued from page 54*)

content to condense to any marked extent.

A fourth trap or clean-out basin with a baffle inclined slightly off of the horizontal is provided at the point that the pipe line is brought above the ground to connect with a riser leading up to the top of the cereal plant building. This basin serves as a collector of water of condensation in addition to being the last dust trap in the system. Since the installation of the heat interchanger, there is very little water of condensation even at this point, 1,000 ft. from the blower. It is also fitted with a water-sealed vent pipe, which vents the gas when the pressure on the line exceeds 6 in. of mercury column pressure. This vent is a safety provision in case a stoppage in the riser or a sticking of the vent valve at top of riser causes a build-up of excessive pressure in this collecting basin or separator.

From the top of this separator to the top of the nine-story plant, the gas line is a cypress wood tube or riser with a 12-in. inside diameter from which an 8-in. inside diameter cypress header leads off onto the fourth or grinding floor. The top of the riser is fitted with a counter weighted, damper-type valve to give a constant gas pressure on the lines leading to the grinders of slightly less than 6 in. of mercury.

The take-off lines from the 8-in. cypress header to each of the five grinding mills are 5-in. inside diameter copper tubes fitted with manually operated sliding gate valves. These valves are electrically connected through a mercoid switch to each starting switch for the grinder motors. Unless the sliding gate valve leading to the grinder is open to admit gas to the grinder, this electrical safety switch will not permit starting the motor for that particular grinder.

Each copper take-off line connects directly into the throat of a grinder just below the feed regulator. In that way, the gas has an opportunity to diffuse through the cereal to be ground and to dilute the oxygen content of the air in the mill feed before the material being ground strikes the grinding surfaces of the mill.

Calculation of the economic advantages derived through the use of non-inflammable gas in the grinders is very difficult, if it can be made at all. However, during the years that this practice has been followed, even on an experimental basis, explosions in the grinding system have been stopped and loss of life, as well as property damage, and the resulting loss in output has been avoided. The expenditures made in connection with this gas treating and handling system have easily been taken care of by the savings resulting from the prevention of fires and explosions. An added advantage has been gained through improved efficiency in the grinding operations plus the continuity of operations throughout the entire cereal plant.

Largely through the installation of this gas system and its effective operation under the control of such indicating and recording instruments as CO_2 meters, thermometers, and draft and pressure gages, the Quaker Oats Co. has been able to get coverage with an insurance company which will write only preferred risks. For that reason, Quaker Oats gets a low premium rate and is able to offset directly at least a part of the gas treating and handling expense.

One hazard in this use of flue gas is the possibility of the presence of inflammable and toxic CO. No source of flue gas containing CO should be used, as a matter of protection to the operator's health even though the concentration of CO would be below that which would support combustion.

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SHE orders by brand name but she actually means: "The bread in the soft, fresh-feeling wrapper. The cheese in the transparent package which keeps it so tasty. The Crackers that are always crisp. Butter in that protective carton (the wax never rubs off!). Soap which is sealed in a wrapper to keep it fresh and quick-acting. Cookies in the box which is both moistureproof and greaseproof. The ice cream in the easy-opening carton which fits my refrigerator tray." Convenience, cleanliness, protective properties — these are basic factors in consumer choice and they are fundamentals of these and every MENASHA food-packaging development.

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Menasha's Precision Papers for Precision Packaging

Gas Storage

(*Continued from p. 48*)

blueberries, black raspberries, currants, pears, apples and oranges showed more tolerance of the gas. Grapes, peas, sweet corn and carrots stood extreme treatments with particularly favorable results.

Bartlett pears, Grimes Golden, Jonathan and Delicious apples were as firm and as free from disease under initial carbon dioxide treatments as they were by immediate storage at 32 deg. F. Carbon dioxide treatments tended to prevent the shattering of grapes. Sweet corn, cauliflower, peaches and carrots treated with carbon dioxide were distinctly sweeter than those stored in air at the same temperature.

The effect of carbon dioxide treatments upon the carbohydrate and upon carbohydrate and acid contents of fruits and vegetables has been studied by Miller and Brooks[11] and Miller and Dowd.[12] These investigations indicate better preservation of sugars in sweet corn, lima beans and carrots under the carbon dioxide treatments. In tomatoes the reduction in acidity accompanying ripening was not inhibited by carbon dioxide treatment.

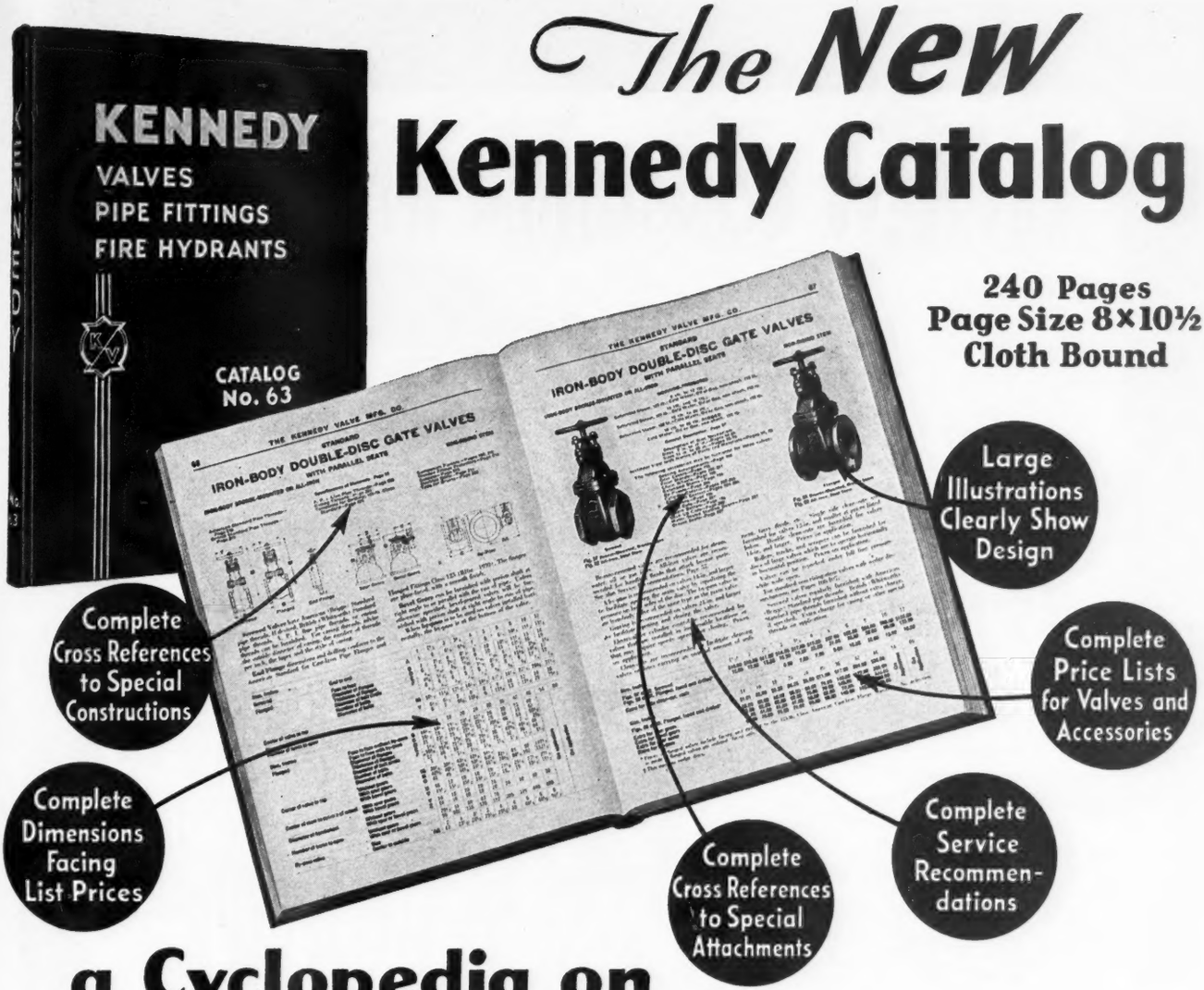
Interest in research on carbon dioxide in the refrigeration industry is indicated by the action of the American Institute of Refrigeration in their appointment of a committee for carbon dioxide research.[3] This committee fosters research on the carbon dioxide preservation of foods. Projects now under investigation include cream preservation at Purdue University; the preservation of butter at the University of Minnesota; and that of meat at Michigan State College. Other products to be studied include citrus fruits, deciduous fruits, vegetables, cheese, fish, poultry and eggs.

Conclusions

It is concluded from this review of the work that has been accomplished on the storage of fruits and vegetables in artificial gas mixtures that further development will probably take place in the gas storage field. There is need for a standardization of materials and methods in building storage units for studies in the application of essential equipment, and for research to determine optimum gas mixtures for types and varieties of products.

Investigations are generally in agreement that the gas storage method retards ripening and postpones senescence without much impairment of flavor in certain fruits and vegetables, but that for some varieties and types of products, the method has definite limitations.

The New Kennedy Catalog



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GROWING INTEREST in vitamin B_1—increasing awareness by consumers that this important health factor is woefully scant in the daily diet—has already suggested new sales advantages to certain food producers, and *should* suggest them to others.

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Now this loss can be offset—more nutritional value and consumer appeal put into many food products—by the easy addition of "Crystalline B_1 Winthrop" to restore *fully* lost B_1 potency.

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Formulas for Foods

FORMULA NO. 119

Taffy

Corn sirup	**2,500 grams or oz.**
Sweetened condensed whey. Whey solids 40 percent	**3,750 grams or oz.**
Sugar 40 percent	
Water (if necessary for mixing)	**150 grams or oz.**
Total	**6,400 grams or oz.**

Working directions

Cook with stirring to 243 deg. F. Cool by pouring on a stone slab. Then pull and flavor.

Formula from B. H. Webb and C. F. Hufnagel, Bureau of Dairy Industry, U. S. Department of Agriculture, Washington, D. C.

FORMULA NO. 120

Marshmallow Topping

Egg albumin	**16 oz.**
Corn sirup	**75 lb.**
Corn sirup	**20 lb.**
Sugar (sucrose)	**20 lb.**
Water	**3 qt.**

(Heat three items above to 238-240 deg. F.)

Imitation vanilla extract	**8 oz.**
Cream of tartar	**2 oz.**
Fine granulated sugar	**7 lb.**
Shortening (70 deg. F.)	**2 lb.**
Vanilla extract	**2 oz.**
Cocoa powder	**1 lb. 10 oz.**
Milk (liquid)	**4 lb. 8 oz.**

Working Directions

Soak egg albumin in about half a gallon of water over night. Put corn sirup into beater. Put 20 lb. corn sirup and 20 lb. sugar into kettle with 3 qt. water and boil to 238-240 deg. F. Pour this hot sirup into beater and start beating. Add egg solution and imitation vanilla extract. Beat 5 to 8 minutes or until 1 gal. weighs 4 lb. (A common marshmallow beater is a barrel with arms inside like a dough mixer.)

Formula from David Algie

FORMULA NO. 121

Coconut Devil's Food Cake

Cake flour	**4 lb.**
Salt	**2 oz.**
Baking soda	**1½ oz.**

Sift together the flour, salt, soda and cream of tartar. Place this mixture in bowl of mixing machine. Add the other ingredients. Using the paddle, mix until smooth for about 3 minutes on low speed and 2 minutes on second speed. Scrape sides of bowl when necessary to insure complete mixing.

Whole eggs	**2 lb. 8 oz.**
Milk (liquid)	**1 lb. 8 oz.**

Mix eggs and milk together. Slowly stream this mixture into preceding mixture during 2 minutes mixing on low speed. Stir lumps out of bottom. Finish to smooth batter by mixing for about 2 minutes longer on second speed.

Total weight of mix is 23 lb., 9 oz., or 377 oz.

Best results are obtained when a temperature of finished batter is between 70 and 75 deg. F. Use shortening at 70 deg. F.

Directions apply to a 3-speed machine. For a 4-speed mixer, use second and third speeds.

Pans: Use 8x8x2-in. pans. Grease sides with ordinary shortening. Use paper liner in bottom.

Scaling: Scale 14 oz. of batter per pan. Spread evenly.

Baking: Bake for 20 to 22 minutes at 365 to 375 deg. F. Bake until done, but do not overbake. Do not dump these cakes while hot, but remove them from pans as soon as cool.

Finishing: Prepare fondant butter cream icing (Formula 124) and homemade boiled icing (Formula 125).

Brush loose crumbs from sides of the layers. Spread a liberal amount of fondant butter cream icing over one layer and place a second layer on top. Allow cake and filling to set for 15 minutes. Slice evenly to make two bar-shaped cakes. Ice with homemade boiled icing and garnish top and sides liberally with coconut.

Formula from General Foods Sales Co.

FORMULA NO. 122

Liver Pudding

Hog livers (scalded)	**35 lb.**
Hog skins	**20 lb.**
Hog stomachs	**20 lb.**
Beef tripe	**10 lb.**
Hog gut fat	**15 lb.**
Dry milk solids	**3½ lb.**
Onions	**4 lb.**
Salt	**3 lb.**
White pepper	**6 oz.**
Marjoram	**1 oz.**
Nutmeg	**2 oz.**

Cook hog skins, hog stomachs, beef tripe, and hog gut fat, until tender.

Place hog skins, livers, hog stomach, beef tripe, gut fat, onions and dry milk as in order named in silent cutter. While chopping, add spices. Chop fine. Put in trucks, add plenty of meat broth (will take from 20 to 25 lb.) and mix well.

Stuff in beef rounds, then cook 30 min. Chill in cold water. When chilled hang up to dry.

Formula from Dry Milk Institute

FORMULA NO. 123

Peanut Bar

Sugar (white granulated)	**15 lb.**
Corn sirup	**9 lb.**
Spanish peanuts (raw)	**15 lb.**
Dairy butter or hardened vegetable oil	**8 oz.**
Salt	**2 tablespoonfuls**

Heat sugar and corn sirup in pan over open fire with continuous stirring.

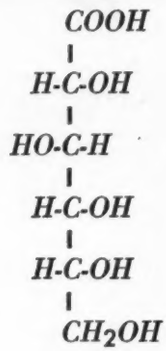
At 240 deg. F. stir in peanuts, salt and butter or hydrogenated oil. Continue heating until peanuts have desired degree of roast.

Pour out on oiled cooling slab with removable sides to form layer of desired thickness. Allow to cool to stiff consistency before removing side forms and scoring into bar portions.

When thoroughly cold break into individual bars and pack with waxed paper between layers.

During cooling, fine granulated sugar may be sprinkled over surface to reduce surface stickiness.

GLUCONIC ACID



FOR INDUSTRIAL USE

IN addition to use in the fields of foods and pharmaceuticals this acid, its lactone, and its salts are finding ever-widening utilization in other branches of industry.

GLUCONIC ACID, although a relatively strong organic acid, is but slightly corrosive, and its value in processes involving the cleaning of metallic surfaces is being more and more widely recognized.

In the presence of this acid, or its salts, many metals such as iron, aluminum, chromium, etc., are not precipitated from solution by alkalis. This unique property has been used to advantage in the preparation of a number of widely divergent products and we feel sure will be of assistance in solving many other problems encountered in the chemical industry.

Further information in regard to these compounds will be gladly supplied and we will be pleased to discuss their possible application in specific problems.

Manufacturing Chemists

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Merck Chemists Find Vitamin B_6 Synthesis
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Merck Chemists Report Absorption Tests Confirmed Theory Of A Bridge Between Nuclei
Vitamin B_6 Synthesis Reported By Merck
BALTIMORE—Proceedings of the symposium on vitamins held here recently in connection with the annual meeting of the American Chemical Society were interrupted by receipt of a telegram from Merck & Co., Inc., Rahway, N. J., to report that the total

HEADLINES announcing fundamental discoveries in the vitamin field by Merck chemists and their collaborators have provided frequent and striking illustrations of the outstanding role played by Merck in the development of this important line.

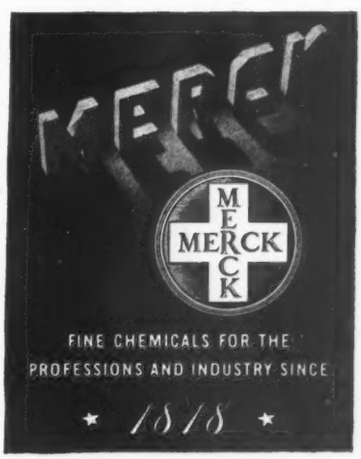
In August 1936, headlines announced the synthesis of Vitamin B_1 in the Merck Research Laboratories—a brilliant achievement—and subsequently they told of the chemical indentification and synthesis of Vitamin E (alpha-tocopherol) in the same laboratories. More recently, Merck chemists succeeded in isolating, identifying and synthesizing Vitamin B_6, followed shortly by Pantothenic Acid, the most recently synthesized member of the vitamin B group—two accomplishments which again made headlines in scientific and other publications. In addition to these noteworthy contributions, Merck has developed methods which have made possible the commercial production of other important vitamins, including Riboflavin, Ascorbic Acid, and Nicotinic Acid.

With vitamins commercially available in pure crystalline form, it is now economically and technically practicable for the manufacturer to restore or fortify the vitamin content of his products. By using the pure crystalline vitamins, troublesome problems of color, odor, taste, and bulkiness are completely eliminated.

Merck offers valuable technical assistance in the restoration and fortification of your products with crystalline Vitamin B_1. Our technical staff and laboratories are prepared to render service on such important factors as adequate distribution and retention of the vitamin, and product control methods. Why not call us in today and learn how easily and economically pure crystalline Vitamin B_1 can be incorporated in your products.

Write for the recently prepared brochure, "The Use of Crystalline Vitamin B_1 in Foods"

VITAMIN B_1 CRYSTALS MERCK



MERCK & CO. Inc. *Manufacturing Chemists* **RAHWAY, N. J.**

New York • Philadelphia • St. Louis • In Canada: Merck & Co. Ltd., Montreal and Toronto

Edible Lactic Acid is steadily finding increased uses in many food and beverage products. There are definite advantages in using edible lactic acid, a few of which are improvement in taste, flavor and odor, controlled acidity and better food preservation.

Investigate the possibilities offered by Du Pont Edible Lactic Acid. A trial will convince you—as it has many chemists in the food industry.

Visit the du Pont Wonder World of Chemistry Exhibits at the New York World's Fair and on the Boardwalk at Atlantic City.

DU PONT

E. I. DU PONT DE NEMOURS & CO. (INC.)

GRASSELLI CHEMICALS DEPARTMENT

WILMINGTON, DELAWARE

DU PONT *Edible* LACTIC ACID

FORMULA NO. 124

Fondant Butter Cream

(For Formula No. 121)

Fondant (see formula No. 24 or 39)	**10 lb.**
Butter (at 70 deg. F.)	**2 lb.**
Shortening (at 70 deg. F.)	**3 lb.**
Vanilla extract	**1 oz.**

Cream well on low speed for 3 minutes, then for 3 minutes on second speed.

Whole eggs	**10 oz.**

Add the eggs slowly, and continue mixing on low speed for 5 minutes, then on second speed for another 5 minutes. *Do not beat on high speed.*

• Total weight of mix is 15 lb. 11 oz., or 251 oz.

Formula from General Foods Sales Co.

FORMULA NO. 125

Homemade Boiled Icing

(For use with Formula No. 121)

Sugar	**10 lb.**
Cream of tartar	**1 oz.**
Water	**3 lb.**

Mix ingredients thoroughly. Make sure all sugar crystals are washed down from sides of kettle. Boil to 260 deg. F.

Egg whites	**4 lb.**

Place egg whites in machine bowl. Whip on second speed to about three-fourths of full volume or to a wet peak. Continue mixing on second speed while slowly pouring in the boiling hot sirup. Beat until stiff but avoid overbeating.

Vanilla extract	**1 oz.**

Add flavoring after icing has cooled slightly.

Formula from General Foods Sales Co.

FORMULA NO. 126

Polish Sausage No. 2

Cured beef trimmings	**25 lb.**
Cured ox lips	**15 lb.**
Cured pork tripe	**25 lb.**
Cured beef hearts	**10 lb.**
Cured pork trimmings	**15 lb.**
Back fat (cubed)	**10 lb.**
Dry milk solids	**3½ lb.**
Seasoning	

Chop ox lips and pork tripe fine in silent cutter, adding dry milk, ice and cereal while chopping. Make this emulsion fairly soft. Place back fat in chopper and chop just long enough to get cubed effect. Grind beef and beef hearts through ⅛ in. plate, and pork trimmings through ⅜ in. plate. Place all in mixer and add seasoning (7 oz. black pepper, 2 oz. coriander, 4 oz. garlic).

Stuff in beef middles or corresponding artificial casing about 18 to 22 in. long. Smoke in 120 to 150 deg. F. until the desired color is obtained. Cook 30 to 45 minutes (depending on size of casing) at 160 deg. F. Spray or submerge in cold water for 5 to 10 minutes.

See also General Directions (Formula No. 27).

Formula from Dry Milk Institute

FORMULA NO. 127

Form Cakes or Turk's Heads

Basic sweet dough (formula 27, 45 or 46)	**10 lb.**
Sugar (granulated)	**1¼ lb.**
Butter	**1 lb.**
Egg yolks	**½ lb. (10 yolks)**
Eggs (whole)	**½ lb. (5 eggs)**
Almonds (ground)	**5 oz.**
Raisins	**2 oz.**
Citron	**1 oz.**
Lemon gratings	**1 lemon**
Mace or other spices	**to taste**

Cream sugar and butter slightly. Mix in other ingredients.

Cut sweet dough into small pieces and add to mix with a little water. Mix at slow speed to give a soft, spongy dough.

Grease Turk's Head pans and fill each with the desired weight of dough. Give full proof and bake at medium heat (350 deg. F.).

After baking, turn out and dust with powdered sugar.

FORMULA NO. 128

Prune Corn Flake Whip

Prunes, cooked	**5 qt.**
Gelatine, plain	**10 tbsp.**
Water	**1¼ cups**
Milk	**2½ qt.**
Sugar, granulated	**2l¼ b.**
Salt	**1 tsp.**
Vanilla extract	**4 tbsp.**
Whipping cream	**2½ qt.**
Corn flakes	**7½ qt.**

Pit prunes and cut into small pieces. Moisten gelatine in cold water. Scald milk, remove from heat; add moistened gelatine, sugar, salt and flavoring, and mix thoroughly; cool. Whip cream stiff, combine with milk, prunes and corn flakes, and mix thoroughly. Chill until firm.

Serves 60 to 80 portions.

Formula from California Dried Fruit Research Institute

Editor's Note: This is an institutional formula and is published to show others how product uses may be promoted.